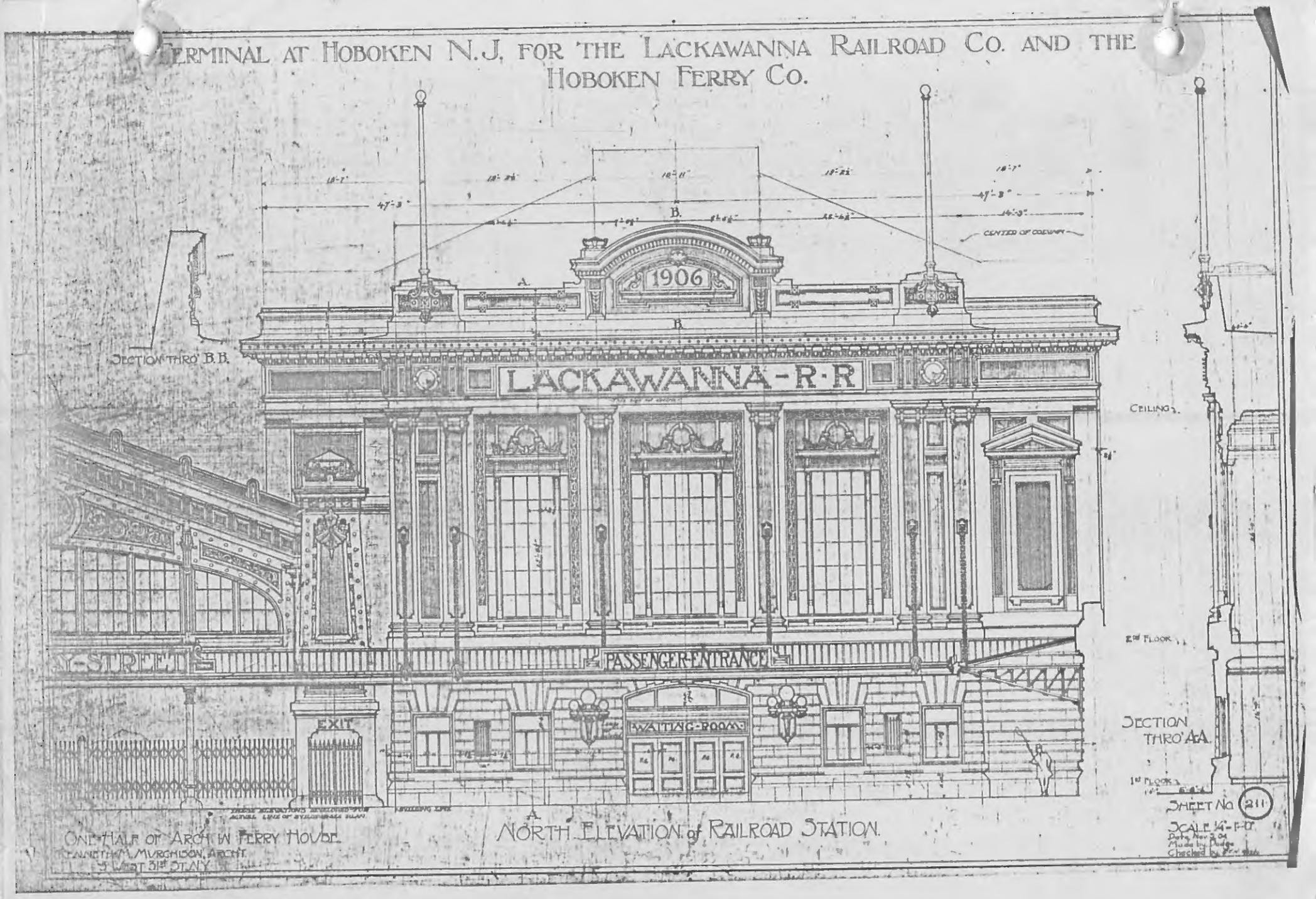

A HISTORIC STRUCTURES REPORT ON THE ERIE-LACKAWANNA TERMINAL AT HOBOKEN, N.J.

prepared by the Hoboken Community Development Agency May, 1982
written & researched by Patricia Florio, Restoration Specialist

ERIE LACKAWANNA TERMINAL

HISTORIC STRUCTURES REPORT

HOBOKEN, N.J.

Prepared by:

The Community Development Agency

City of Hoboken

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Mayor

Fred M. Bado
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Preface

This study of the Erie-Lackawanna Terminal Complex is designed to assist all those involved in the restoration and redevelopment process. It will serve as a consolidated source of historical and technical information on the terminal at the time of its construction. As such, it provides an information base that can be enhanced by the addition of current analyses of the buildings' present state.

I am grateful to the following individuals who have assisted me in gathering the data used in this report: Theodore Conrad of the Hudson City Historical Society, Jim Hans, John Willever, Nancy Zerbe of the State Office of Historic Preservation, and Frank T. Reilly of the Tri-State Railway Historical Society; for arranging access to technical information on the Terminal, Mayme P. Jurkat of Stevens Institute of Technology; for arranging access to the Records and REA Buildings, Robert B. Callahan, Al Meyers; and for taking record photographs of present conditions, Barbara Reilly, all of N.J. Transit.

I. Introduction

A. Significance of Building and Related Sites

The Erie-Lackawanna Terminal complex at Hoboken represents, essentially intact, a late 19th century to early 20th century intermodal facility of tremendous local and national significance.

From an architectural standpoint, the terminal has several outstanding buildings. These are the Rail, Ferry Passenger and Baggage Buildings, designed by New York architect Kenneth M. Murchison. At the time that he designed the terminal, Murchison was at the start of a long and successful career in which he distinguished himself as a designer of rail stations and terminals. The consensus among experts in the history and engineering fields on the significance of the terminal complex is best summed up in a statement by Robert M. Vogel of the Smithsonian Institution:

> As the last of the great New Jersey Hudson River terminals to survive, the building takes on special significance in New Jersey's industrial and transportation history, quite apart from its special architectural merit. [1]

The terminal was described by Edward Hungerford in his book, The Modern Railroad, as the first use of the low-lying Bush trainshed, with its roof, slotted for proper venting of engine smoke, resulting in "...a clean train-house,...admirable protected from the stress of weather."

In the same book, Hungerford commented that...

> Those who come and go through its portals find themselves in a succession of white and vaulted hallways and concourses that suggest a library or museum more than the mere commercial structure of a railroad corporation.

This aspect of the terminal is an important one, as well as a difficult one to grasp, given the current appearance of the complex. The design of the terminal reflects the City Beautiful movement's committment to provide imposing and dignified public buildings that could be considered civic achievements. Indeed, this sense of pride on the part of the city is evident in the Hoboken Board of Trade's 1907 History of Hoboken. In it, the terminal was listed under the section, "prominent buildings," and was described as "... the beautiful new terminal of the DL & W Railroad."[2] Even though the building was still under construction at the time of publication, it significantly was featured in a pen and ink sketch on the 120-page booklet's cover

Of special note, too, is the way the movement of passengers was accounted for in the design of the terminal.

The passenger terminal building was planned to accomodate passengers from ferry, rail and trolley lines, therefore its form reflects several different axes. An article appearing in Insurance Engineering in 1906 describes the way in which the passenger traffic was resolved:

> In the general layout of the terminal, the necessity for handling the heavy traffic was the main consideration. Approximately 100,000 persons per day are carried by the three ferries entering the terminal, about one-half of whom are passengers on the railroad. A very large percentage of this traffic is concentrated into a few hours in the morning and the late afternoon, and to provide for rapid loading and unloading, to prevent congestion of the various lines of traffic, to accommodate a waiting throng of 20,000 which might readily congregate in the event of a breakdown of the ferry service for an hour or more, and to locate a convenient and commodious waiting room restaurant, officials' quarters and other adjuncts of a modern railway terminal presented no small problem in design.
>
> As arranged, passengers upon arriving may proceed on the same street level to the street cars in Hoboken, which has a terminus close to and north

> of the train concourse; or, still on the same level to the waiting room, the ferry concourse or the lower floors of the ferry boats. But those who wish to utilize the upper decks of the ferry boats are provided with an inclined passageway, which, at the very easy gradient of 10 percent, takes people from the level of the tracks to the level of the upper decks on the boats.[3]

Groups of incoming and outgoing ferry passengers were separated by a westbound concourse on the northern side of the station, with steps leading from the second to the first floor. "Every phase of traffic seems to have been so studied that any crowding due to a conflict of direction is rendered impossible by the disposition of the gates and passageways."[4]

The ferry slips, each in varying degrees of disrepair, are noteworthy for their novel passenger bridge support, developed by consulting engineer E.W. Stern. The "Stern patent bridge" united the passenger bridges to the upper deck with the lower deck, thus giving it the flexibility to rise and fall with the tides.

During both World Wars, Hoboken ferry boats were utilized to transport troops to New York for overseas posts.[5] (A special section of this report is devoted to the history of the Hoboken ferry, and the many boats which served it.)

Another type of function was accounted for in the design of the terminal complex: that of the processing of immigrants. In the Hoboken terminal, this was accomplished by constructing a building split for two functions.

The Immigrant and Pullman Co. Building is located to the south of the main passenger area of the terminal. Completed by 1905, it is a fireproof, two story building divided to serve two separate functions. The portion devoted to processing immigrants was that on the eastern side. It is set on a

canal, and was served by a boat used to transport immigrants from Ellis Island to Hoboken. The main waiting room of this building was finished with materials which allow for its fumigation and hosing down; the corners of the walls were rounded, and the northern end of the building had a large exhaust fan.

An article in The Railway Age in 1905 described the need for separating the "immigrant business" from the "general passenger business" of the railroad:

> ...the disagreeable sights and smells which accompany those recently landed from the steerage of European steamers nowhere confined to a particular spot. [6]

The western side of the building was devoted to the Pullman Company. It housed storage and repair rooms, business offices and waiting rooms for pullman workers. Seven "wash tracks" are located west of the building, with equipment for cleaning and performing interior repairs for Pullman and Passenger Coaches.

This building survives and is now used as a garage and office area. The survival and historical significance of this building makes it a noteworthy part of the terminal complex.

The terminal had an overall scheme for lighting which used natural light, augmented by electric lights as necessary. Significantly, the lighting concept reflects the architect's desire to play textures and forms as contrasts; light never appears in a purely ornamented fashion, but in a pragmatic functional way that didn't distract from the design of the building.

Small incandescent globes "at frequent intervals" were used to light the waiting rooms and restaurant, as well as on the outside of the terminal building and tower. The study of the literature contemporary with the terminal's construction underscores the growing importance and power that electric lights held at that time.

Natural light was used extensively to illuminate the larger expanses of the terminal. This lighting was augmented where necessary by electric lights.

The Bush train sheds were comprised of wire-glass, transluscent skylights, which were 6 feet wide. These panels were so designed to also let light pass through into the railroad cars. An article in Electrical World of 1908 noted that 1063 lamps were used to light the train concourse:

> The lamps on the train concourse are placed beneath the steel work, and the lamps on the platforms are frosted and are spaced five to the arch...At night, the effect is very pretty, indeed.[7]

The upper ferry concourse was lighted by 120 lamps, contained in brackettes, and by 13 rows of incandescent lamps stretched across the ceiling on the girders.[8] In all, there were originally 903 lamps in this area, in addition to the broad skylights. All the skylights in the complex were capped over during World War II as part of the civil defense measures taken to make it more difficult for the expected German Air Force Bombing Raids.

The skylights continue to the south of this area in the concourse, which leads to the former restaurant wing and down to the track level. The skylights of the area in front of the restaurant are smaller than those of the main ferry concourse, and are also "blacked out." They have retained their small incandescent bulbs, set around the perimeter of the skylight. The ramp leading down from this area to the track level was lit by three chandeliers, each of which held 17 lamps.

The main waiting room had the most noteworthy lighting scheme from an aesthetic standpoint. In addition to direct lighting, through the glazed, multi-paned windows of the western wall, the north and south walls also have multi-paned windows which admit indirect light from the corridors which they

line. An art-glass skylight was uncovered during the last phase of New Jersey Transit's rehabilitation programme in 1981. Originally, 70 lamps were located above it, in addition to 40 lamps which were placed in the rosettes of the ceiling. Four chandeliers, each holding 48, 16 cp lamps, were suspended from the corners of the waiting room. 120 clear-bulb lamps were conceiled in the cove, and 18 brackets contained 129 lamps. Above the settees of the waiting room were art-glass shades running their length, with 336 4-cp lamps.[9]

The main ferry waiting room in the area which became a US Postage station during World War II, was the only large room which required artifical illumination at all times.

The most elegant enclosed spaced on the second floor of the ferry building was a dining room, located in the southeast corner of the second floor off the ramp leading to the track level. This room featured windows on its south and east sides, and a roof balcony equipped for dining, extending out over the dock area. This affords it pleasant breezes, and a stunning view of the NY skyline. The restaurant was known to be a fine dining area and to have had a distinguished atmosphere. As John Perry recollected in his 1957 book, American Ferryboats:

> The terminal had a fine restaurant, finished in the rare woods, bronze, gilt, and gleaming mirrors, with white linen on the tables and attentive waiters. Back in those days, there were other niceties, too: the skylights were washed occasionally, and perhaps even the bright work was polished now and then.[10]

The effect of grandeur was enhanced by an oval, recessed ceiling. The lighting scheme was rather elaborate, according to a contemporary account. The lighting scheme was designed to create an intimate surrounding:

> In the dining room...164 frosted lamps are used, and the balcony outside...is lighted by 60 lamps in six pedistals and by 20 lamps in the lattice work overhead. The lamps in the restaurant are for the most-part on brackets, each holding four lamps, and two chandeliers each holding 24 lamps. There are also four six-lamp clusters on the ceiling, and 16 lamps in the square,[1] at whose corners clusters are placed.

The charm of this room had begun to fade by the 1930's, however, and eventually, the offices of Conrail were relocated there. The windows of the south and eastern walls have stained glass in their transoms on the interior, and are shielded of the exterior by unornamented glass.

The applied ornament, and stained glass windows, are not visible from the interior of the room due to the presence of a hung ceiling, suspended from the plaster domed area. This ceiling was installed c. 1974 to ease the air conditioning of the office space. To accommodate the lowered ceiling, the tops of the pediments above the windows were sawed off. It is not possible to view the ceiling area without pushing up one of the hung panels while standing on a ladder. It is believed, however, that the original ceiling is intact several feet above the false ceiling.

A large portion of the original decorative trim of this room survives, and changes have generally been reversable. In addition, original construction drawings have been located, making the restoration of this important room a viable option.

The facade ornamentation of the terminal was conceived in the idiom of Beaux Arts Classicism. On the river facade, the six ferry slips are spanned by copper arches. The view of the building from the river was dominated by a clock tower which was 203' above mean tide to the base of its flagpole.

The Clock Tower was similarly of steel frame, and hollow. It was originally conceived to support a 2,500-lb. fogbell, and was supported on a single foundation block. The area under the tower is closely piled, and a 2-course timber grillage built over the piles. On this grillage was laid a concrete footing, which extends to within four inches of the finished floor, or 6 feet above mean low tide. This footing encloses a steel grillage of two courses of beams, securely connected by angles and bolts. The four columns of the tower rested on the upper course of beams, and were imbedded in concrete footing.

The tower had a four-face clock, which was part of system installed in the terminal by the Self Winding Clock Co. Each clock face was set in a rectangular opening and flanked by braquettes and surmounted by a pediment.

Copper was used extensively on the exterior of the terminal for roofing and facade ornamentation. The approach to its treatment reflects the growing concern at the beginning of the 20th century with honestly-expressed structure and materials. Although the copper is "applied" ornamentation, its detailing demonstrates a concern for the expression of the copper as a metal, as illustrated in the following quote by Kenneth M. Murchison:

> The ornamental details of the copper work were carefully studied with a view to preserve the character of the material and give a 'metallic felling' to the design. Details and moldings usual in stonework cannot be copied successfully in sheet metal without modification, and all appearance of an attempt to imitate stone or other material was carefully avoided. [12]

A "verdigris" finish was applied to the copper to accentuate certain ornamental features. This was achieved by treating the copper with acetic acid.

The copper was applied to the building by first being formed to the specified architectural design, and reinforced with strap iron riveted to it at the back. The strap iron was punched with bolt holes, corresponding exactly to the holes left in the concrete finish. The latter holes are accurately spaced by template. Copper-headed bolts are used to secure the copper to the concrete. When the sheets were in place, all bolt-heads and seams were soldered.

The terminal complex, built on the site of a stick-styled terminal built of wood in 1896, and destroyed by fire in 1905, was designed to be completely fire-resisting.

Metal-covered doors and hollow metal frames, and sash with wire glass were provided on the north and south sides in the ferry slips. All waiting rooms and passenger concourses were separated from the offices or storerooms by fireproof doors and windows, to guard against panic.

A system of wet firelines and standpipes, in addition to three permanent turret nozzles on the roof, capable of directing a water-system to any point of the roof, were provided. (The former feature was intact, and its reuse speculated upon, in a 1976 Stevens Institute Study on the terminal.) The firelines were tied into underground lines running throughout the train yards. So comprehensive was the fire-prevention program that railroad desks and chairs were made from incombustible materials.

The ferry plaza bears a statue of Samuel Sloan (1817 to 1907) the first president of DL & W. Mr. Sloan had already attained success as a commission merchant when he became involved in the Hudson River Railroad in 1855. By 1864, he became the Director of the DL & W Railroad. He distinguished himself as an administrator by making the Lackawanna more than a coal road. Routes were extended north and west, and freight handling was increased. In 1876, the rail gauge was changed. In the years beteeen 1881 to 1890, coal shipments increased by 32%, general freight by 160%, and passenger traffic by 88%. Mr. Sloan resigned in 1889.

As Frank Reilly relates in his 1980 article on the history of the terminal,[13] John Starin, a friend of Mr. Sloan, commissioned George E. Bissell to make a life-sized sculpture of Mr. Sloan. The bronze was cast in Paris and was shipped to the U.S. on August 1, 1889. The memorial was a surprise to Mr. Sloan, who refused to have it exhibited during his lifetime. Therefore, after his death in 1907, the year in which the new terminal was completed, his statue was placed in the plaza. According to local legend, the statue was suspended from a crane for two days while the city and railroad were deciding which direction it should face. The present position of the statue represents a compromise, as it faces both the terminal and the city.

Notes to I.A

1. Letter from Robert M. Vogel, Curator, Smithsonian Institution, Division of Mechanical & Civil Engineering, to Charles Goree of Hoboken Model Cities, Aug. 24, 1972.

2. History of Hoboken (Hoboken: Board of Trade, 1907) p. 73.

3."The New Lackawanna Terminal," Insurance Engineering, Vol. XII, No.5, pp. 403-404.

4.Ibid., p. 404-405.

5.Harry J. Smith, Romance of the Hoboken Ferry,(N.Y.: Prentice Hall, 1931), p. 131.

6."Lackawanna's Eastern Terminal at Hoboken," The Railway Age, p. 226.

7."Electrical Equipment of the Hoboken Terminal of the Lackawanna," Electrical World, April 4, 1908, p. 689.

8. Ibid.

9. Ibid.

10. John Perry, American Ferryboats, (N.Y.: Wilfred Funk, 1957), p. 169.

11. Electrical World, p. 689.

12. Quote from Kenneth M. Murchison

13. Frank T. Reilly, "A Comprehensive History of Hoboken Terminal," Block Line, Vol. IX, No. 5, Oct. 1981, p. 2 .

B. Previous Restoration History

New Jersey Transit began a series of capital improvements to the terminal in 1978, financed through a $4.5 million E.D.A. Grant, which covered the three-phased programme.

The first phase involved repairing the roof above the waiting room. Phase two involved repairs to the train sheds and train concourse. The original glass skylights, which were missing a considerable number of transluscent panels, were infilled in opaque materials, excepting over the train concourse, and over track one. Train shed water drainage, which was originally through pipes in the shafts of the columns of the train sheds, needed to be remedied, as rust and leakage caused damage to many of the cast iron capitals. Cast iron was cleaned by sandblasting, and new column capitals were cast in fiberglass to replace missing elements, and drainage pipes were run along the western edge of the columns, so as not to detract from the general design of the sheds as viewed from the train concourse. Not all column capitals were replaced, and a significant number of columns to the western end of most platforms are missing their capitals.

Under the third phase, the terminal's main waiting room was repaired and repainted where water damage had occurred, and restrooms were rehabilitated.

The Hoboken Terminal also received a separate facade restoration grant of $150,000 from the State Office of Historic Preservation. Under this grant, the upper facade of the YMCA Building, Terminal, and waiting room art-glass skylight were restored.

This work was carried out by the Newark firm of Becker, Bendixen and Murphy/Ralph Jefferson as a joint venture.

The paint and surface analysis performed for the waiting room interior appears in Appendix E.

I C. Report and Relationship to Master Plan

The historic structures report was prepared by Patricia Florio, Restoration Specialist on the planning staff of the Hoboken Community Development Agency. This report was completed in June 1982 and was completed in-house by the Community Development Agency using funds provide for by the U.S. Department of Housing and Urban Development.

The production of this report stemmed from a need to establish a basis for the continued rehabilitation of the terminal in ways that would be sympathetic to its wide-ranging architectural significance.

The following are reports produced over the past decade that reflect planning concerns and changing attitudes toward the role of the terminal and its potential for redevelopment: Only the Preliminary Engineering Survey deals with the historical aspects and physical conditions of the properties.

1. Preliminary Engineering Survey, Hoboken Rail Passenger and Ferry Terminal Building Complex prepared for Wurster, Bernardi and Emmons, Architects by Richard P. Browne Associates (April 1976)

2. Hoboken Transportation Center Study prepared by Hoboken Community Development Agency and Raymond, Parish, Pine and Weiner, Inc. for the Tri-State Regional Planning Commmission, Urban Mass Transportation Administration and U.S. Department of Transportation (February 1977)

3. Southern Hoboken Development Study Project prepared by Ramond, Parish, Pine and Weiner, Inc.; Wurster, Bernardi and Emmons, Architects. (November 1977)

4. Market Analyses and Development Programs for Designated Waterfront Redevelopment Districts in Jersey City and Hoboken, N.J. prepared by the American City Corporation for the Port Authority of N.Y. and N.J. and N.J. Department of Transportation/N.J. Transit (draft, February 1980).

II Administration

A. Location of Structures:

Ferry & Rail Passenger Terminal, Baggage and YMCA Building, 1 Hudson Place

Immigrant and Pullman Building, Slip #1

Records Building, 111 Observer Highway
Railway Express Agency Building, 115 Observer Highway

B. Proposed uses of Structures:

Ferry and Rail Passenger Terminal, Baggage and YMCA Building - ground floor and second story of Ferry Building, upper stories of YMCA Building: Hoboken Stages, Inc., a series of movie sound stage and film production studios.

Ferry Slip Building between slips 1 and 2, ferry concourse and ramp leading from track level to roughly point where waiting room stairway is located: offices of Conrail (N.J. Transit)

Immigrant and Pullman Building: continued occupation for railroad purposes.

Railway Express Agency Building: currently vacant, it may be utilized for rail-related administrative offices.

III. Historical Data

A. Previous Uses of Land & Previous Structures on Site

The Erie-Lackawanna Rail and Ferry Terminal complex occupies an archeologically and historically important site. It is the fifth and grandest rail terminal structure in the area. It is essential to note that, as a means of transportation, the ferry preceeded the rail terminal by several decades. The history of landfill in the terminal area is indicated in the succession of the line of solid filling as indicated on maps from 1804 to 1917. The first of these maps indicates the shore line coming up to the present Hudson Street. The first landing ferry landing appears as a long, diagonally-oriented building near the present, south east corner of Newark and Washington Streets.

During the 1840's, the city experienced a major period of growth. By mid-decade, the Hoboken ferryhouse was architecturally joined to the offices of the Hoboken Land & Improvement Company, the land management company founded by the heirs of Col. John Stevens. One of the company's objectives was to bring more residents to the city, and so it set about erecting a square block of houses on the site of the former ferry landing.

From the landing, a flow of passengers was created before the handsome headquarters of the Hoboken Land & Improvement Company (an early design of the important New York architect, Alexander Jackson Davis), to view what was among the finest blocks of housing built in Hoboken. At this time, among the area's last vestiges of rural setting were a green, and two hotels on the inlet to the south of "Ferry St., now Observer Highway. Hoboken had become the favorite spot for area residents, who enjoyed its pleasant breezes. Col. Stevens had landscaped an area bordering the riverfront north of 4th St., which became known as River

Walk. It featured walks, a grotto with natural spring water refreshments, and a colonaded pavillion in an area near present 10th and 11th Sts. in the area of the city then known as Elysian Fields.

By the 1870's, the terminal area had become a center of banking and commerce. Among the major financial institutions to locate themselves in the terminal area were the Hoboken Bank for Savings, the First National Bank, the Second National Bank, and the Trust Company of New Jersey. Duke's House, a restaurant which featured fine wines and liquors, was also located at the foot of Hudson Place, in the midst of ferry and rail activity.

The location of the Headquarters of the Hoboken Land & Improvement Company mirrors the continued eastward shift in the site of the terminal. Sometime c. 1893, the company moved to and eclectic-styled building at the foot of Newark Street, in direct proximity to the new Stick-Styled terminal and extended trolley lines. This building, still standing today, incorporates in its design many features suggestive of elements in ferry boats. An interior stairway toward the center of the building is of dark mahogony, and leads up to a graceful landing in the center of the vestibule. A shed, which originally encircled the entire building between the first and second floors, suggested the location of a deck when viewed from the river, the building resembles a ship. The style of the building pre-dates the Beaux-Arts exhuberance of the 1907 copper-clad terminal.

The complexion of the terminal area was greatly altered by a fire which started in 1905 at the terminal, and which also destroyed the frame Duke's House.

On the evening of Aug. 7, 1905, fire was discovered around the smokestack of the ferry boat Hopatcong, docked in the north Christopher St. slip at the

Hoboken Terminal. Flames quickly spread to its upper deck and the side of the ferryhouse, and onto the upper structure of the ferry boat, the Binghamton. The fire burned the ferryhouse to ruins not more than 5 feet high. By 7 a.m. on August. 8, clearing and erecting temporary accomodations proceeded, and ferry boats were running to Barclay and Christopher Streets. Once temporary ferry sheds were complete, work on the new ferry terminal was begun within that week.

The 23rd St. Terminal of the DL&W RR, ER & CR NJ was destroyed on Dec. 20, 1905, by a fire caused by painters. The portion of the building affected by the fire was the second most important passenger terminal in the City. So severe was the fire that it caused the copper-sheeted facades to melt and drip off into the street.

The 1907 terminal buildings differed from previous terminal structures in that they were built on piles and reinforced concrete foundations over water to a depth of 20 feet. Of the buildings on the river, only the southeast corner of the Baggage Building was built on an area of solid fill.

B. Construction History of Buildings to be Restored

1. People Involved

Architect:

Kenneth M. Murchison (1872-1938) was the designer of the Rail and Ferry Terminal Buildings which date from 1907, and the Pullman and Immigrant Building, dating from 1905. In 1904, he was commissioned to design the 23rd St. Ferry house of the DL&W, Erie, and Central Railroad of New Jersey. Murchison accounted for the problems of settlement of the piles on the muddy river bottom and shocks received from the ferryboats entering the slips by utilizing a steel frame capable of withstanding uneven settlement of the piles and the impact of the boats. He used copper for exterior cladding material.

Murchison received the commission for the Hoboken Terminal sometime in 1904. The Hoboken Terminal had similarities in its major design features. Its construction was also steel frame, clad in copper. Like the 23rd St. terminal, it also had a 225-foot high clock tower. The configurations of the Hoboken and 23rd St. terminals were different, but they stylistically complimented one another. Included in his plans for Hoboken Terminal was the paired Immigrant and Pullman Building, completed by 1905, and the Rail and Ferry, and Baggage Buildings, completed in 1907.

The following is the text of the Biography of Murchison from The National Cyclopaedia of American Biography:

> Murchison, Kenneth Mackenzie, architect, was born in Brooklyn, N.Y., Sept. 29, 1872, son of Kenneth Mackenzie and Katherine (Williams) Murchison, grandson of Duncan and Katherine (White) Murchison, and great-grandson of Duncan Murchison, who came to this country from Scotland in 1775 and settled in Cumberland County, N.C. His father was a merchant. Kenneth M. Murchison was graduated Ph.B. at Columbia University in 1894 and studied architecture at the Ecole des Beaux-Arts, Paris, France, during 1897-1900. For two years after his return from Europe he was associated with the New York City architectural firm of Lord, Hewlett & Hull and from 1902 until 1934 practiced his profession independently in New York City. His work included designs for the terminal of the Delaware, Lackawanna & Western Railroad Co., Hoboken, N.J. (1906); Union Station of the Pennsylvania Railroad Co, Baltimore, Md. (1912); the Havana (Cuba) Union Station (1914); the Jacksonville (Fla.) Union Terminal (1917); the Munson Steamship Line Building, New York City (1921); and the New Colonial Hotel, Nassau, B.W.I. (1923). Other designs of his included the Murchison National Bank, Wilmington, N.C.; U.S. Marine Hospital, Staten Island, N.Y.; and the First National Bank, Hoboken. He served as president of the Beaux-Arts Apartments, Inc., and the Beaux-Arts Development Corp., Narragansett, R.I., and drew the plans for the apartment building and the Dunes Club. In 1934 he became public relations counsellor, with the title of vice-president, for the Central Savings Bank, New York City, and continued in that capacity until the close of his life. He was a member of the board of

governors of the Real Estate Board of New York for some years and in 1935 was one of three advisers to Fiorello H. LaGuardia (q.v.), then mayor of New York City, charged with the selection of a panel of fifty architectural firms from which were to be chosen the designers of all major municipal building projects during the ensuing year. During the First World War he served as a captain in the U.S. Army Engineers and was with the Emergency Construction Divison, U.S. War Department, Washington, D.C., until being honorably discharged in 1919. In 1907 he was decorated as Officer d'Academie by the French government and in 1931 was decorated chevalier of the Legion of Honor of France. An honorary Litt.D. degree was conferred on him by Columbia University in 1929. He was a fellow of the American Institute of Architects and a member of the Architectural League of New York, Society of Beaux Arts Architects (pres. 1925), Society of American Military Engineers, Society of Terminal Engineers, American Institute of Banking, Rehabilitation and Moderization Association, New York Financial Advertisers Association, the American Society of Authors, Composers and Publishers, Delta Phi, and the University Racquet and Tennis, Columbia University, West Side Tennis, Mendelssohn Glee, Coffee House and Amateur Comedy clubs of New York City. For several years he conducted a column, "Mr. Murchison says," in Architect, on developments of interest to architects. Another of his interests was music, which he began composing for student plays while attending Columbia and continued to write for the Beaux Arts Society while in Paris. One of the organizers of the annual Beaux-Arts Society balls in New York City in 1913, he directed its orchestra thereafter until his death. During the First World War he wrote "The Kilties," a popular march, and he also composed music for many songs. Because of his physical resemblance to Geroge Washington (q.v.), he played the role of the first President in many of the Washington Bicentennial pageants in 1932. Murchison was married in New York City, Apr. 5, 1903, to Aurelie, daughter of Eugene Adolphe de Mauriac of that city, a stockbroker, and had two daughters: Katherine, who married (1) Ashbel Green, Jr., and (2) Hays Rittenhouse Browning; and Aurelie, who married Edouard de Wardener. His death occurred in New York City, Dec. 15, 1938. [1]

Engineers:

Lincoln Bush (1860-1940) As Chief Engineer of the D.L.&W. Railroad he designed a trainshed that sheilded each rail platform with its own covering. As constructed, Bush trainsheds cover 14 tracks and a length of 607 feet. Each shed covers two lines of track and 1/2 the train platform. This innovation heralded the end of the popularity of the ballon-type of shed. This was repeated in the train sheds at the Scranton PA station of the DL&W Rr., but it was in the Hoboken Terminal that the shed was first utilized.

A biography of Bush, which appeared in The National Cyclopaedia of American Biography, is herein provided:

> Bush, Lincoln, civil engineer, was born in Palos Township, Cook Co., Ill., Dec. 14, 1860, son of Lewis and Max (Ritchey) Bush and grandson of John and Prudence (Pickett) Bush of Vermont. He was graduated M.A. at the Cook county normal school in 1881, and after teaching for three years in rural schools in that county entered the University of Illinois, where he received a B.S. degree in 1888. For the next eighteen months he was employed as an assistant engineer on the Wyoming division of the Union Pacific railroad, working on maintenance and construction and on location survey of the Pacific Short Line between Ogden, Utah, and Green River, Wyo. In January 1890 he became an assistant engineer with the firm of Morrison & Corthell, bridge builders of Chicago, Ill. In December 1891 he was made chief draftsman and office assistant engineer for the Pittsburgh Bridge Co., in Chicago, continuing with that company until June 1896 when he was appointed assistant engineer, on masonry design for bridges, with the Chicago drainage canal board. In January 1897 he became assistant bridge engineer and acting division engineer for the Chicago & North Western railroad and in January 1900 bridge engineer for the Delaware, Lackawanna & Western railroad. Two years later he was made chief engineer. In this capacity he performed one of his most brilliant engineering feats, namely the moving and lowering in 1903 of the 1000-ton drawbridge at Newark, N.J., within the time of one tide (twelve hours) by means of sand

jacks on barges. He also surveyed and planned the construction of the cutoff between Slateford, Pa., two miles below the Delaware water gap, and the watershed at Lake Hopatcong, N.J. In January 1909 he opened an office in New York City as consulting engineer and in his many years of service, both in that capacity and as a member of large construction companies, he attained a prominence such as few others of his profession enjoyed. During 1912-16, as chief engineer of the contracting firm of Flick-wir & Bush, Inc., he constructed the Tunkhannock viaduct for the Delaware, Lackawanna & Western at Nicholson, Pa., which was reputed to be one of the largest masonry bridges ever built. As a major, and later as lieutenant colonel and colonel, in the construction division of the quartermasters corps of the U.S. Army during the first World War, Bush was associate officer in charge of the engineering division and was responsible for the design and practical operation of the seven terminal ports at Boston, Brooklyn, Port Newark, Philadelphia, Norfolk, Charleston and New Orleans, and also for fourteen interior warehouses located at industrial centers. These, together with three arsenals and other miscellaneous projects of which he was in charge, totaled in cost $234,000,000. Bush was the first to apply the sand jack to lowering great weights through long distances and he was the inventor of a new method of constructing concrete pile footings, the Bush train shed and Bush track construction. He was an honorary life member and president in 1928 of the American Society of Civil Engineers and a member of the Western Society of Engineers, American Railway Engineering Association and Engineers Club, New York City. In 1904 the University of Illinois conferred an honorary D.Eng. degree upon him. In religion he was a Presbyterian and in politics a Republican. He found his relaxation in gardening and in life in the field and forest. He was married in Colfax, Ill., Oct. 15, 1890, to Alma Rosetta, daughter of Charles Hudson Greene, a Civil war veteran and builder of Ottawa, Ill., and they had two sons; Cedric Lincoln and Denzil Sidney Bush. He died in East Orange, N.J., Dec. 11, 1940.[2]

Charles C. Hurlbut, engineer for Kenneth M. Murchison, in cooperation with Mr. E.W. Stern, the consulting engineer for the foundation work, developed a concrete and steel foundation to support the complex over the river.

The concrete and steel foundations rest on piles to stabilize the structure and allow for unequal settlement under the terminal area. The pile loading was fixed by the engineering department of the railroad company, which also worked out the plans of the foundations in detail and carried out their construction under Lincoln Bush. Mr. Stern also designed and applied for patents for supports for the ferry passenger bridges leading from the second floor concourse. For most of their length, the bridges are rigidly hung from the trusses above. Their outer sections are supported from the portion of the bridges, below, and rise and fall with the tide. The trainshed, buildings were erected under the supervision of Joseph Snell, Superintendent of Docks and Buildings.

Contractors and Suppliers:

clock: Self-Winding Clock Co.

copper work; Herman and Grace (Brooklyn, N.Y.)

electrical work: Peet, McAnerney and Powers (N.Y., N.Y.)

general contractors: Snare and Triest (N.Y., N.Y.)

heating and ventilation: Baldwin Engineering Co., (N.Y., N.Y.)

metal fireproofing: Assoc. Expanded Metal Companies

ornamental ironwork: Whale Creek Iron Works

plumbing: Gus Staats, (N.Y., N.Y.)

refrigeration: Brunswick Refrigerating Co. (N.Y., N.Y.)

sheet metal: L.O. Koven and Brother

skylight system (for trainshed and elsewhere): G. Drouve Co.

steelwork: Fort Pitt Bridge Works (Pittsburgh, Pa.)

Notes to III.B

1. The National Cyclopaedia of American Biography, Vol. XLII (James T. White & Co., 1958),pp. 456-467.

2. Ibid., Vol. XXXIII (James T. White & Co., 1947), p. 133.

III C. History of Building Uses (see Appendix G for location of building)

Rail Passenger Terminal Main Building: housed an eastbound ferry waiting room and luchroom to the south of the main waiting room on its southside, first floor. On its second floor, eastern side, it originally housed a restaurant with a balcony out over the dock. To the west, along the second floor corridor leading to the main ferry concourse, a barber shop was located. Its original location can be seen from its sign, still over its pedimented entry at the top of the double stairway leading down into the waiting room.

Ferry Building: housed a waiting room on its ground floor, which gave way to the temporary assignment of that space as a mail distribution facility for the Jersey City post office during the 1940's. The floor above this area, the former ferry concourse, was also closed off and used for that purpose.

Immigrant/Pullman Building: processing of immigrants, administrative offices of the Pullman Company.

Records Building: archival storage

Railroad Express Building: executive offices of REA, engineering department of railroad.

Pier A. Mail Sorting Room: the pier itself was built as a wooden decked over area as part of the original terminal complex; the copper clad steel framed structure, the mail sorting room, appears to have been built in the late 1910's or early 1920's, perhaps contemporaneously with the upper stories of the YMCA Building.

The Lackawanna Terminal provided ferry service to New York from the date of its construction to 1967. The following section summarizes the long history of the ferry in Hoboken, from the late 18th century, during which there was a rapid succession of ferry operators.

Hoboken, which is topographically an island, was first inhabited by Lenni Lennape Indians. In the early 17th century, Dutch settlers gained control of Hoboken Island, and it was used primarily as farmland. During years of disputes with area Indians, the last Dutch family to control Hoboken was that of Nicholas Verlett. During the 1670's he passed away, and his Hoboken property was apportioned to his daughter, who sold it to Samuel Bayard of New York. His son William inherited the property.

The following section relates the early history of the Hoboken ferry, as related from the 1931 book, Romance of the Hoboken Ferry. The establishment of ferry service between Hoboken and New York not only spurred the development of Hoboken, but the ferry came to symbolize marine engineering advances in the last quarter of the 19th century.

The need for a ferry became apparent by 1775. On May 8, 1775, after William Bayard petitioned the Common Council of the City of New York, a two-year lease was signed allowing Harmanus Talman to operate a ferry. Cornelius Haring was in charge of the newly-established ferry, which ran from the property of William Bayard to the New York market, near the Corporation Pier at the North River opposite Vesey St. The boats were to have had "Hobook Ferry" painted on their sterns.

The ferry was put under control of the Continental Army, which occupied New York on Aug. 6, 1775. Then, the British occupied New York from Sept. 15, 1776 to Nov. 25, 1783. On Oct. 8, 1784, the New York Common Council gave John Van Alen exlusive annual lease of the Ferry to Hoboken. On Aug. 10, 1785, John Van Alen asked to be relieved of his purchase of lease, and on Wed. the 17th the ferry was offered for sale. On Aug. 31, 1785, Sylvanus Lawrence leased the ferry for three years. When Charles F. Wiessenfels obtained a lease of the ferry,

Mr. Lawrence was given an abatement on rent in arrears.

On July 9, 1788, the ferry was leased to Charles F. Wiessenfels for three years. On March 19, 1789, an advertisement was put out for proposals for operating ferry. On April 15, 1789, John Stevens was highest bidder. He obtained a lease until Dec. 12, 1791.

In July, lease renewal was required of J. Stevens, but the ferry was rented to Joseph Smith in Oct. of 1791 for three years...On May 1, 1795, the ferry was leased for two years. On May 1, 1797, ferry was leased to Joseph Smith for 3 years. (John Town was in charge of Hoboken ferry--the Hoboken House and Ferry accomodations had the best boats on the river--two periaugers and two rowboats.) The Ferry House consisted of three frame shanties, one a waiting room, one a barroom, and a warehouse where farmers deposited their produce while waiting to take it to market. On April 10, 1799, a bid was accepted of Zadack Hedden for leasing Paulus Hook and Hoboken Ferries for three years. Hedden gave up his lease upon being required to give a requisite deposit. During the following two years, the ferries were badly managed. On Aug. 12, 1802, Garret Covenhoven obtained a two year lease.

On March 11, 1805, the N.Y. Common Council ruled that five horseboats and three rowboats be placed on the ferry. On Feb. 1, 1808, the ferry was leased to David Goodwin for three years.

December 11, 1809, J.C. Stevens wrote the Common Council expressing his concern that others had applied for exclusive right to ferry via steam. As a result, on April 11, 1811, it was resolved by the Common Council to investigate alternatives needed to make an accommodation for steamboats. A lease was dated Feb. 5, 1811. After weeks later, the Paulus Hook Co. also obtained a lease, on

a ferry from Cortland St. to Jersey City. On Feb. 9, 1811, Fulton gained his second patent on a steam engine and sail to drive boats. On May 21, 1811, Col. Stevens obtained a patent for a steam engine; Sept. 1811, a craft was christened "Juliana" in honor of the small experimental twin screwboat of 1804, named after the eldest daughter. On April 13, 1811, a lease of 14 years was granted to John Stevens, and later sublet it to David Godwin. Sept. 18, 1811, Godwin announced the running of a steamboat on the Hoboken Ferry. May 24, 1813, Stevens secured the lease to Spring St. Ferry at four years.

On Jan. 13, 1817, exclusive right of ferriage from Hoboken to N.Y. was obtained by John, Robert and Samuel Swartwout of John Stevens through the assignment of leases for operation of Vesey and Spring St. ferries four years plus 2 substitute horseboats. (On May 13, 1817, the landing was changed from Vesey St. to Murray St. due to congestion of carts caused by the proximity of ferry to Washington Market.) Messers. Swartwout then sold the establishment to Phillip Hone. The Ferry Commission felt the landing on Murray St. to be remote, and recommended its permanent relocation at the foot of Barclay St. as soon as ground nearby was filled in and properly regulated. Aug. 14, 1819, ferry pier at Barclay St. was completed and ferry landing established.

In June of 1818, Hone announced that hourly ferry departures would be from 5 am to 8 pm. This perturbed Col. Stevens, whose public house, as well as his '76 house, suffered (as Hone's ferry had a bar on it). Crossing the river was inconvenient, as Hone kept his horses and mules working continuously. Stevens was convinced that the slow growth of his city and development of property and businesses was due to the poor quality of ferry service. In Oct. 1820, Hone held the lease of the ferry to Spring St. In May of 1822, Hone's lease was retired to

J. C. Stevens and his son, Robert L. Stevens, who had been relieved of the Livingston/Fulton monopoly.

Nov. 3, 1821, Hoboken Steamboat Ferry Co. was incorporated. On April 22, 1822, steam ferryboat "Hoboken" was completed. The Hoboken began running on May 11, 1822, and made trips by the hourly ring of St. Paul's Church. As quoted in the Romance of the Hoboken Ferry, the New York Post, made the following report on May 14, 1822.

> The beautiful steam ferryboat, built by Messrs. Stevens, to ply between this city and Hoboken commences its trips. The cosntruction of this boat, which unites all that is desirable in speed, convenience, safety and economy, is highly creditable to the gentlemen who planned it, and in fact, to the mechanical ingenuity of the country.

A lease giving the Canal Street Ferry to Hoboken stipulated the use of steamboat similar to that of the Barclay Street ferry in July 1823. In September of that year, the ship pioneer was demonstrated on the Spring Street Ferry. In 1825, the Fairy Queen was put on the Canal Street ferry.

The following pages list Hoboken ferryboats and their builders: It is important to note that early Hoboken ferryboats were named for reknowned experimenters of steam engineering. Among them were the 1846 boat, the John Fitch, named after the man who tested a steamboat on the Delaware River in 1786; the 1846 James Rumsey, named for the Maryland experimenter who built mechanically-propelled boats as early as 1783, and who launched a steamboat on the Potomic in 1785. In 1851, the boat named James Watt was built. It was named after the instrument maker at the University of Glasgow (active 1767-1784) who applied steam as a positive source of power.

HOBOKEN	1822 Stevens, Barclay St. Ferry, St. running May 11, 1822
PIONEER	1823 Stevens, Spring St. Ferry
FAIRY QUEEN	1825 Canal St. Ferry, its use marked the end of the use of horseboats
NEWARK	1828 (1836 Christopher St. Ferry began, causing the abandonment of the Spring and Canal St. ferries)
PASSAIC	1844 later taken off Hoboken Ferry and sent to Newark
JOHN FITCH	1846
JAMES RUMSEY	1846 (in 1853, destroyed by fire while at Barclay St. slip)
PHOENIX	(Fairy Queen, rebuilt) 1851; in 1856 was first night-boat to be placed on ferries
JAMES WATT	1851
CHANCELLOR LIVINGSTON	1853
PATERSON	1854, re-used machinery from the James Rumsey
HOBOKEN	1861 chartered to U.S. Government in 1862, lost in Burnside Expedition
HOBOKEN II	1863
MORRISTOWN	1864 John Stuart of Hoboken, builder; 682 gross tons, 198' long, 44' wide, draft of 12'
JAMES RUMSEY	1867 John Stuart builder; 206' long, 44 4/10' wide, 11 4/10' draft, 547 net tons, 671.64 gross tons
WEEHAWKEN	1868 a duplicate of the James Rumsey
HACKENSAK	1871 John Stuart, builder; 917.22 gross tons, 757.01 net tons, 251' long, 50' wide, draft 12.03'
SECAUCUS	1873 John Stuart, builder; 214' long, 46½' wide, draft of 12 6/10', gross tonnage 971', net tonnage 792, single-deck, wood hull, cast 121,140
MOONACHIE	1877 John Stuart, sold in 1907 to N.Y. & College PT. Ferry Co.

LACKAWANNA	1881 (first steel hull ferry) Ward Staton Co, Newburgh sold in 1907 to the Norfolk & Washington Steamboat Co., Wash., D.C.
HOBOKEN	1881
HOPATOCONG	1885 John Bigler & Co., Newburgh, N.Y. (completely destroyed by fire while in slip at Hoboken station in 1905, steel hull turned into a coal barge).
MUSCONETCONG	1885 John Bigler of Newburgh
MONTCLAIR ORANGE	1886 last sidewheel ferries, largest ferries built to date, designed by Francis B. Stevens
BERGEN	1888 world's first double screw ferry boat; hull and boilers designed by Hoboken Ferry Co., engine by J. Shields Wilson of Philadelphia, launched at Delamater Iron Works, Newburgh, N.Y.
HAMBURG BREMEN	built Thomas S. Marvel & Co., Newburgh, N.Y. 1891 propeller type, first double-deck boats placed on ferries. In 1905, adjustments were made to allow passenger access for upper deck.
NETHERLANDS	1893 last boat built by Stevens family or H.L. & Co. while having full charge of ferry, built. T.S. Marvel; 1905 upper deck and upper cabin saloon.
BINGHAMTON	built 1905, built at Newport News to replace Hamburg on Barclay St. run.
ELMIRA	built at Newport News for Barclay St. run
SCANDINAVIA	build at Newport News for Barclay St. run
LACKAWANNA HOPATCONG	built 1906
ITHICA	delivered to Hoboken Ferry Co., Sept. 1906 to be put on Barclay St. route to replace Scranton, which was made on auxilliary boat. These boats, built by the Newport News Ship Building and Dry Dock Co., were "the finest type of ferryboats to be found in existence as they brought about a radical departure in ferryboat construction, were the fastest on river."
LACKAWANNA	formerly the Woodbury, built in 1905, purchased by the DL&W RR in May of 1907.
HOPATCONG	built in 1905. (origin. the Callahan) Lackawanna was exchanged for this and Woodbury in 1907. Nov. 1918, railroads and ferries were taken over by the government.

IV. Architectural Data

A. Condition Photographs

The photographs of this section were taken by N.J. Transit photographer Barbara Reilly in April of 1982. They document conditions in the ferry slips, ferry concourse, and YMCA/Baggage Buildings. The additional photographs (polariods) record the southern side of the terminal, the Immigrant/Pullman Building, train concourse, Slip #1, and interior of the waiting room area.

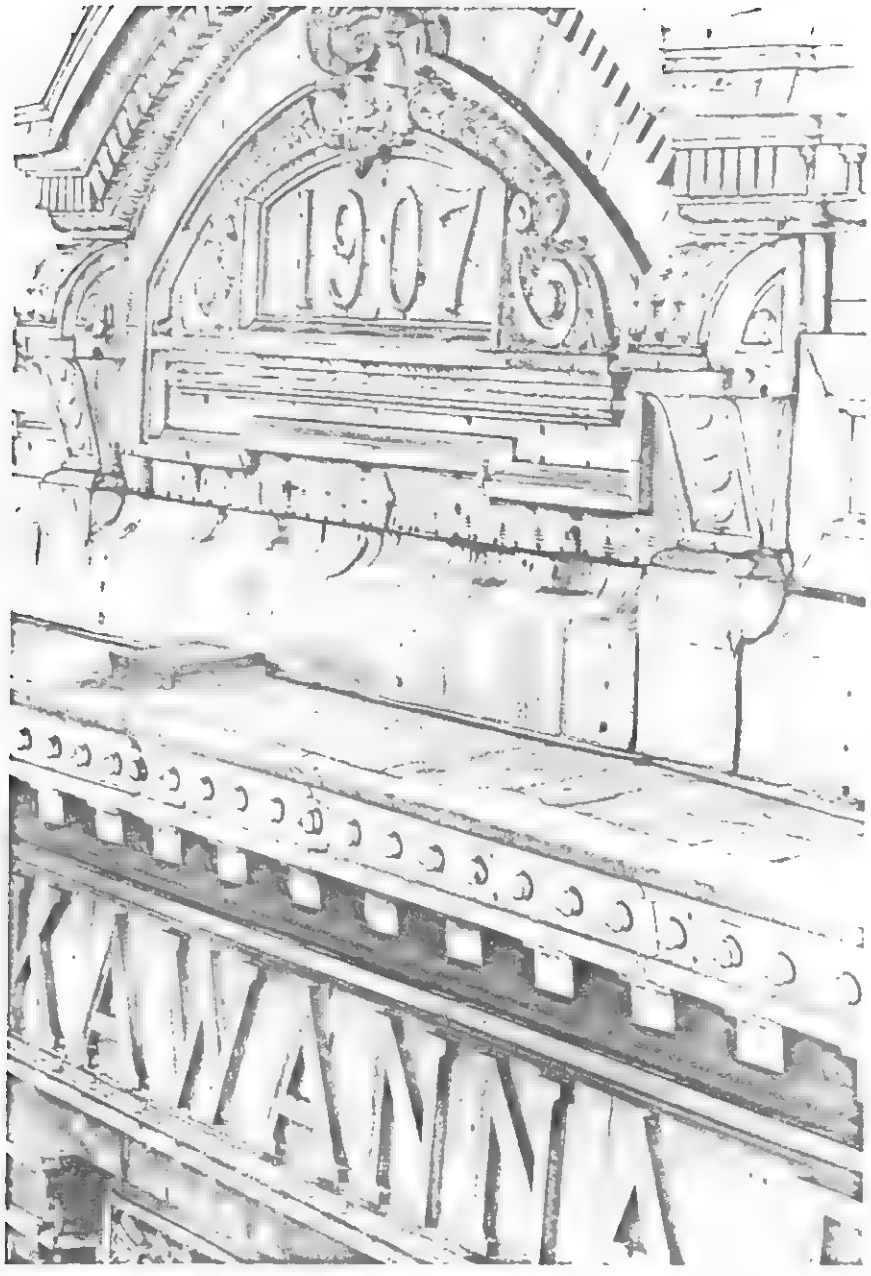
View south showing ferry building to left; waiting room entrance at center, YMCA Building to right.

Western facade of terminal, viewed from roof of train concourse. Note large gap in section of copper cornice above arch.

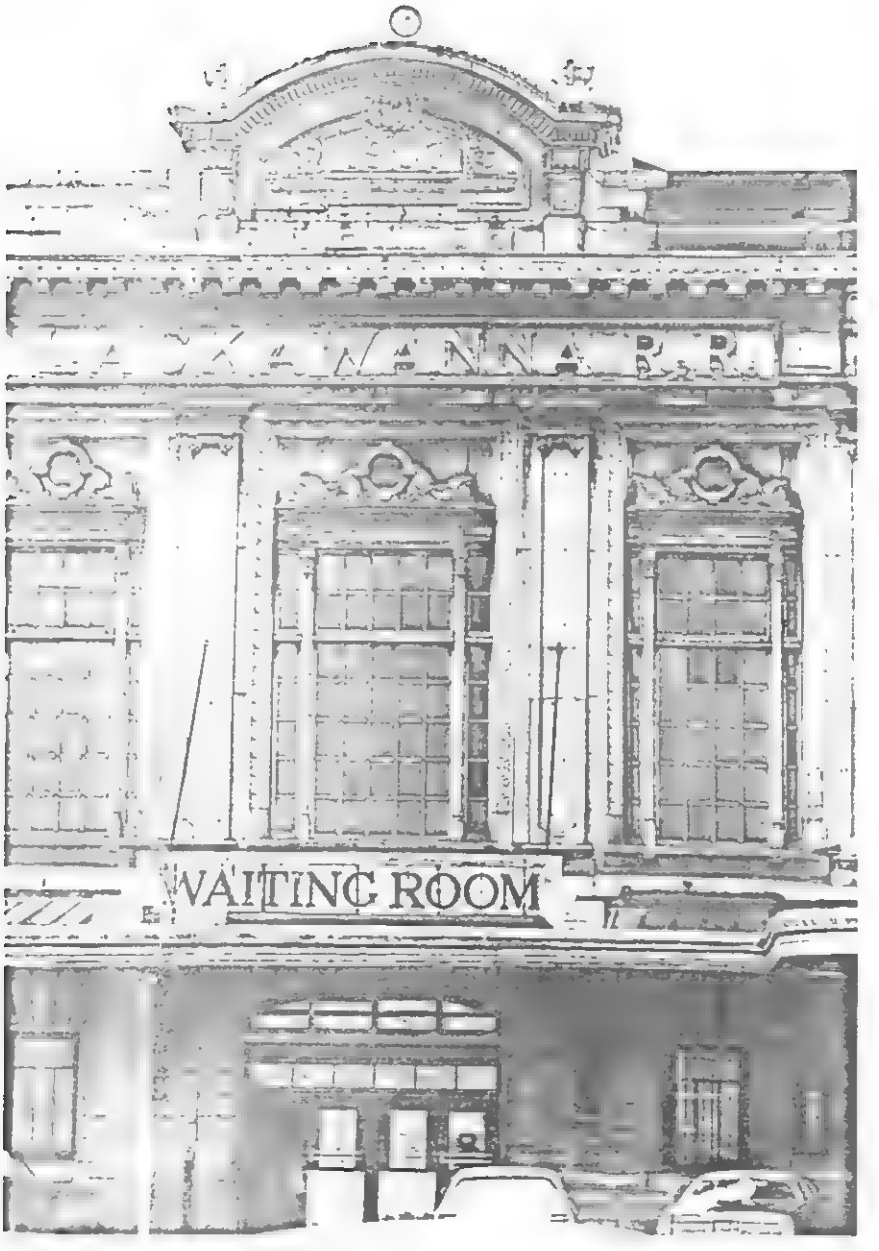
Western facade of terminal, viewed from roof of train concourse, showing plastic "bubble" type of skylight installed to replace glass block skylights removed in phase one of N.J. Transit's rehabilitation programme.

East and north facades of YMCA Building as viewed from ferry plaza. This building was constructed in two phases--the ground floor, with its rusticated arches, was built in 1907 as a baggage building. Sometime after World War I, the upper stories were added for a YMCA to serve trainmen (as designed, the baggage building's upper area was to be reserved for future office space). The upper stories of the building match the style of the 1907 terminal.

Bare western facade of YMCA Building, with Hudson Place in foreground, indicates location of former trolley station.

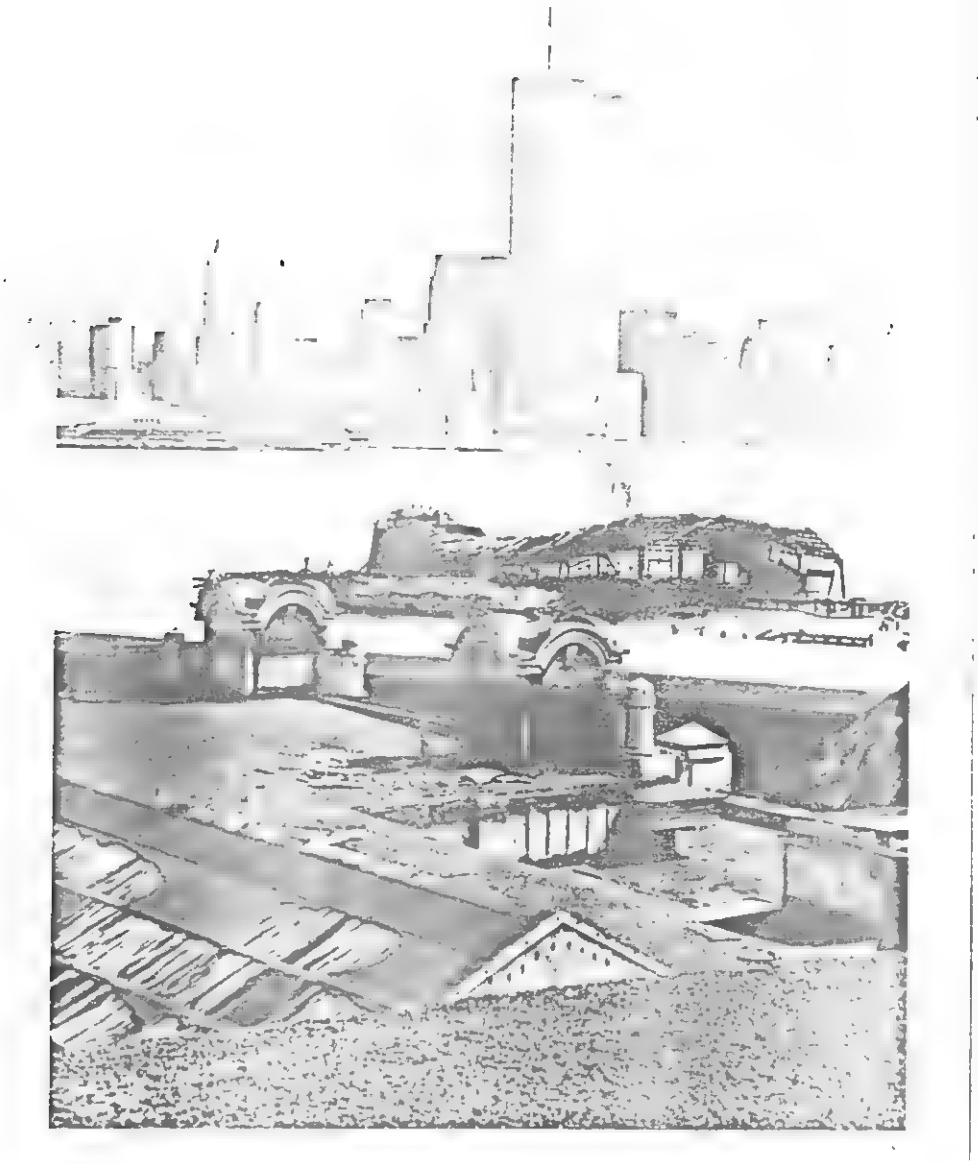


Detail in segmental arch over waiting room facade, giving completion date of terminal.



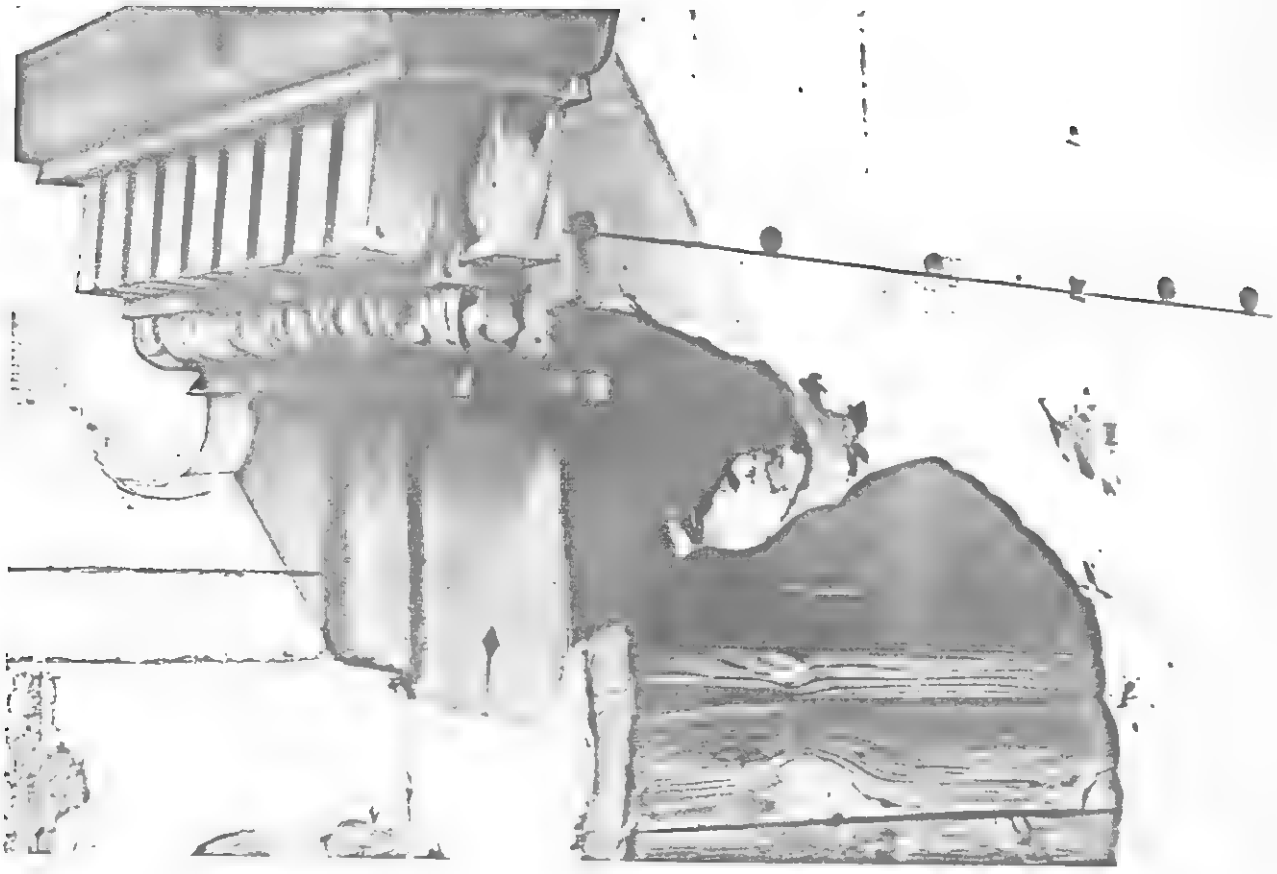
Facade looking south from ferry plaza. Doors from plaza lead to waiting room; tall windows of second storey illuminate corridor between concourse (to left) and YMCA (to right).

View from froof of YMCA Building looking west, down Hudson Place towards Observer Highway.



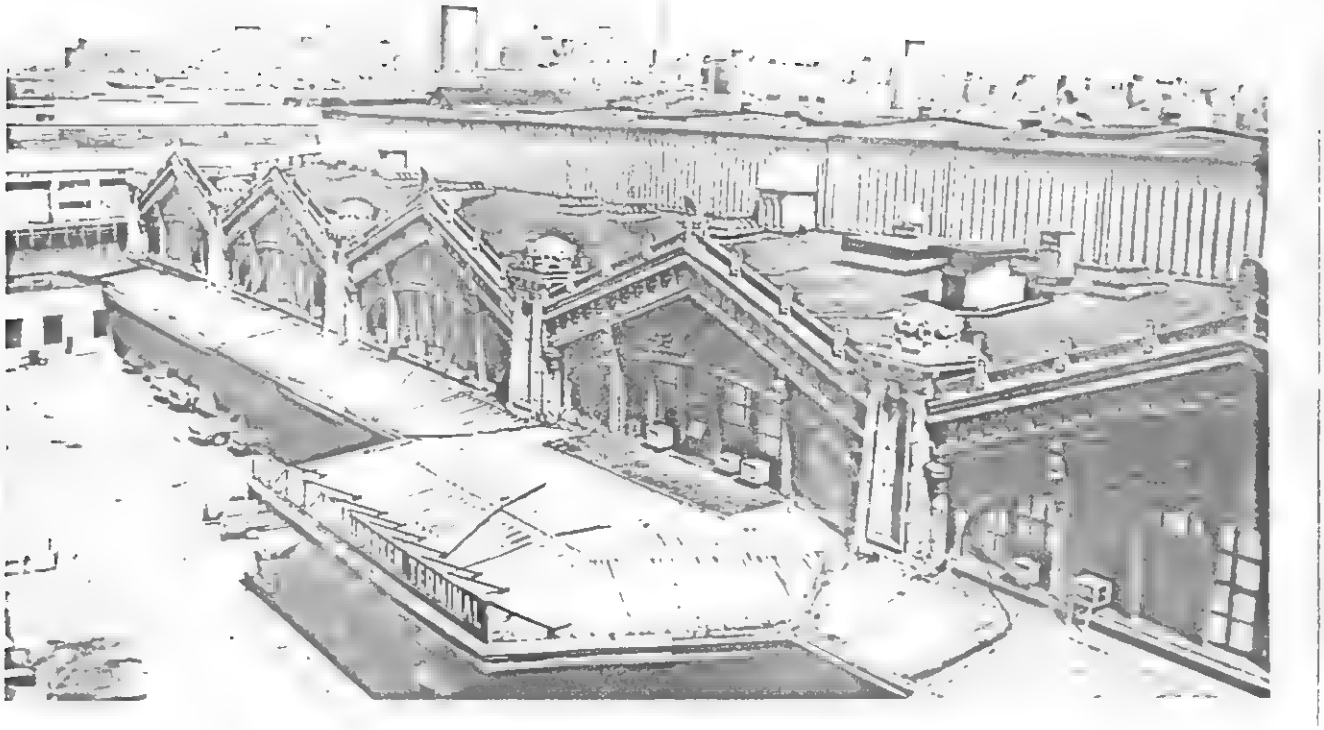
View from roof of terminal, over southernmost ferrybuilding roof area.

Base of former clock tower, visible from roof above ferry concourse, view looking southwest.



Back of segemntal arch of parapet of northern facade of waiting room. This detail shows evidence that copper sheathing has been cut away.

Elliptical, arched windows of ferry terminal building face the terminal's ferry plaza.



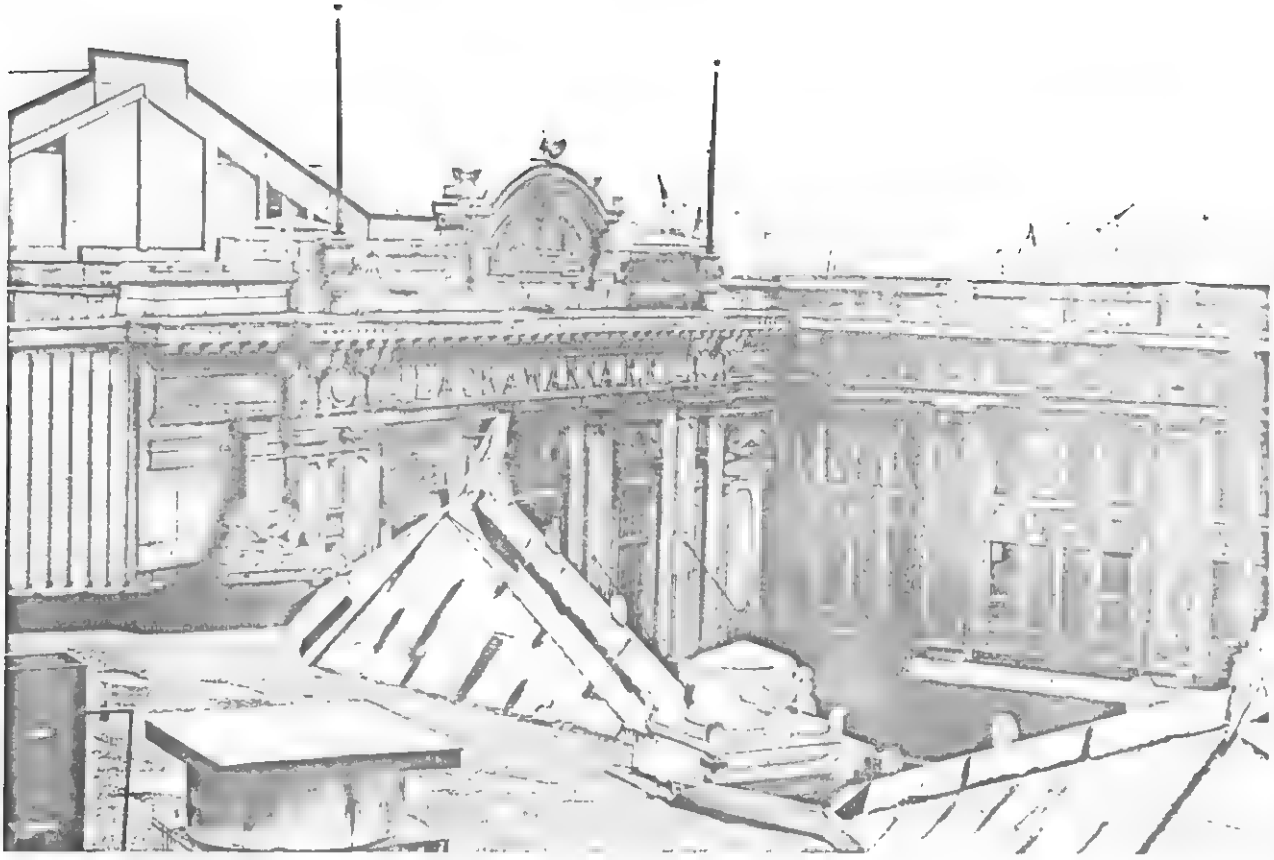
A copper canopy runs between the first and second stories of the terminal's buildings facing the ferry plaza. This is a view of the ferry builidng from the roof of the YMCA Building.

This projecting segment of the canopy of the ferry building was the original location of eastbound ferry passengers' entrance to the ferry.

Eastern bound ferry passenger waiting area, visible to the right from the ferry plaza.

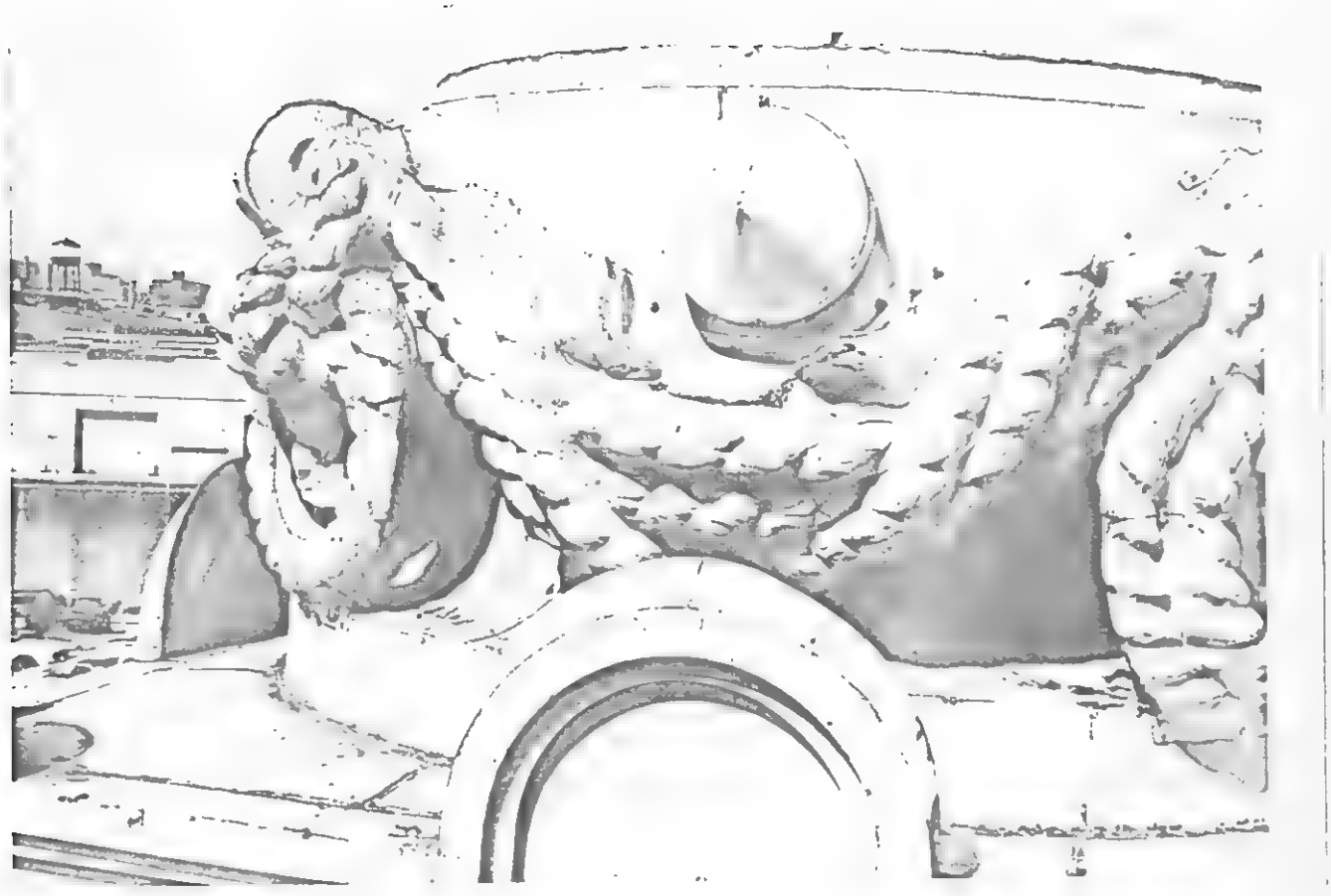
Detail of one of the elliptical windows of the western facade of the ferry building.

View from the roof of the ferry building, looking over the pediment toward the YMCA Building to the west.



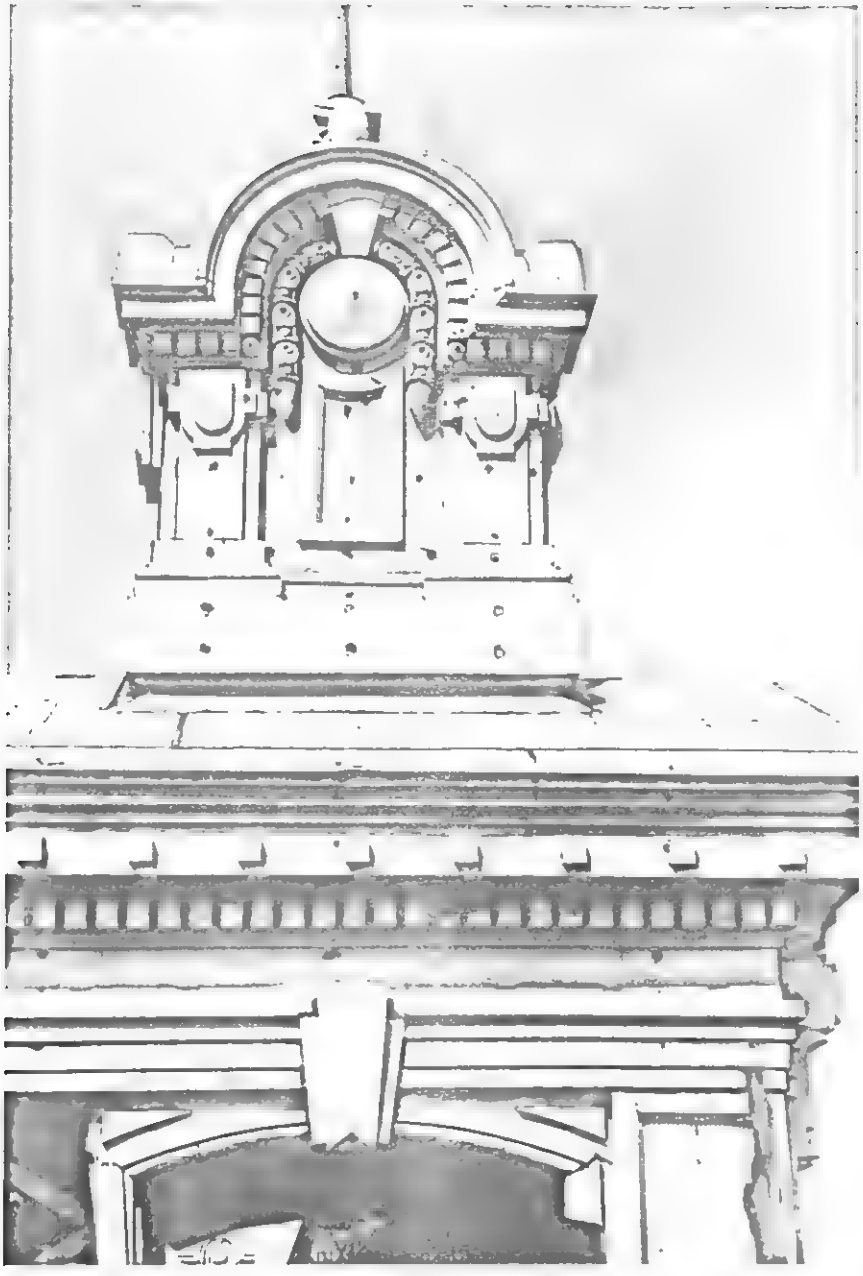
View from the roof of the ferry building, looking southwest toward northern facade of waiting room.

Detail of northern facade of waiting room, viewed from roof of ferry building.



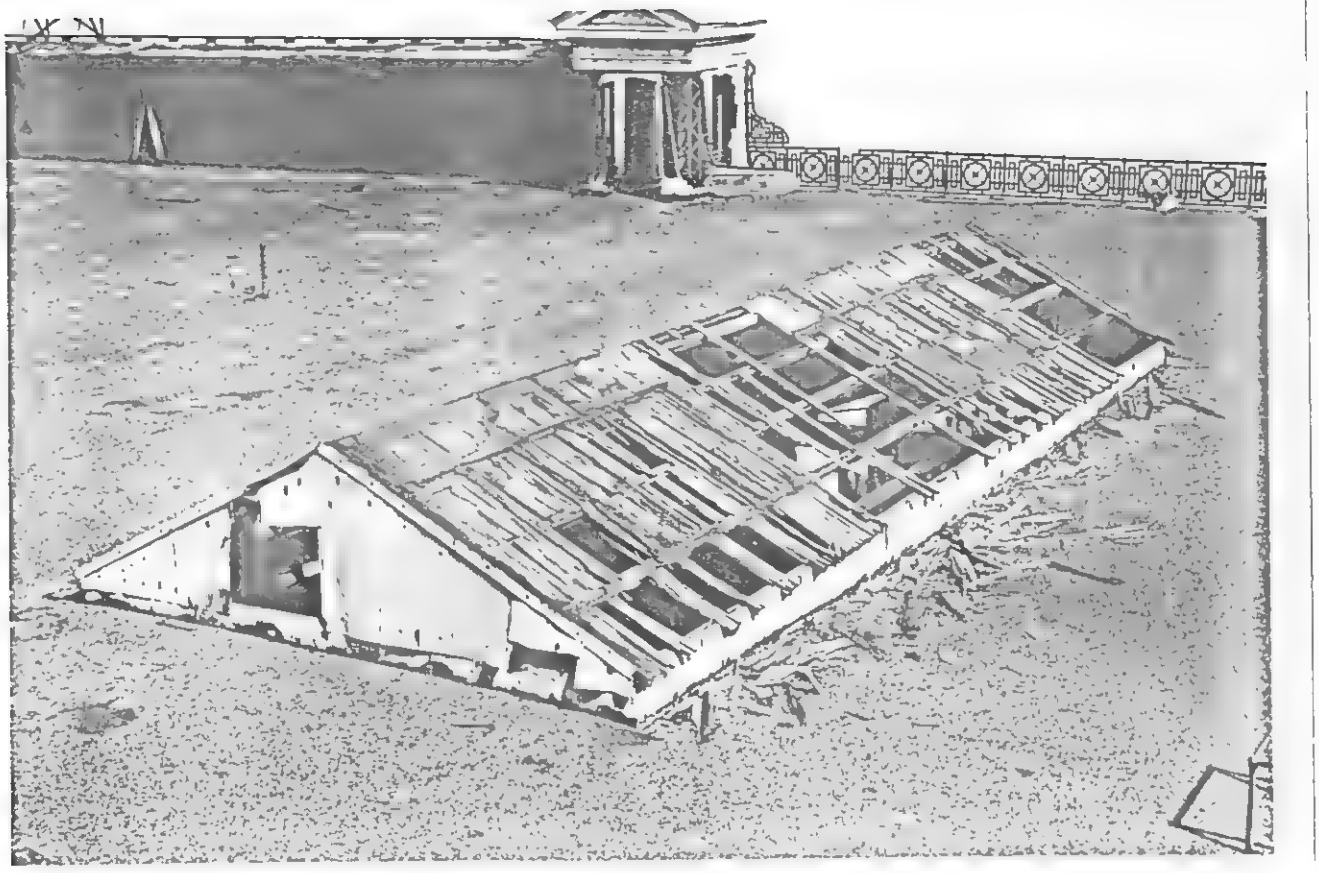
Deatil of decorative urn with a nautical theme at the eastern corner of the waiting room facade.

Northernmost belvedere of parapet over ferry slips.



Detail of western side of northernmost belvedere at parapet of facade over ferry slips.

View of the southernmost belvedere at parapet of facade over ferry slips. Decorative iron railing is seen to the right.



Ferry slips were illuminated by skylights like this one, which shed light over the ramps and passenger bridges leading to the boats.

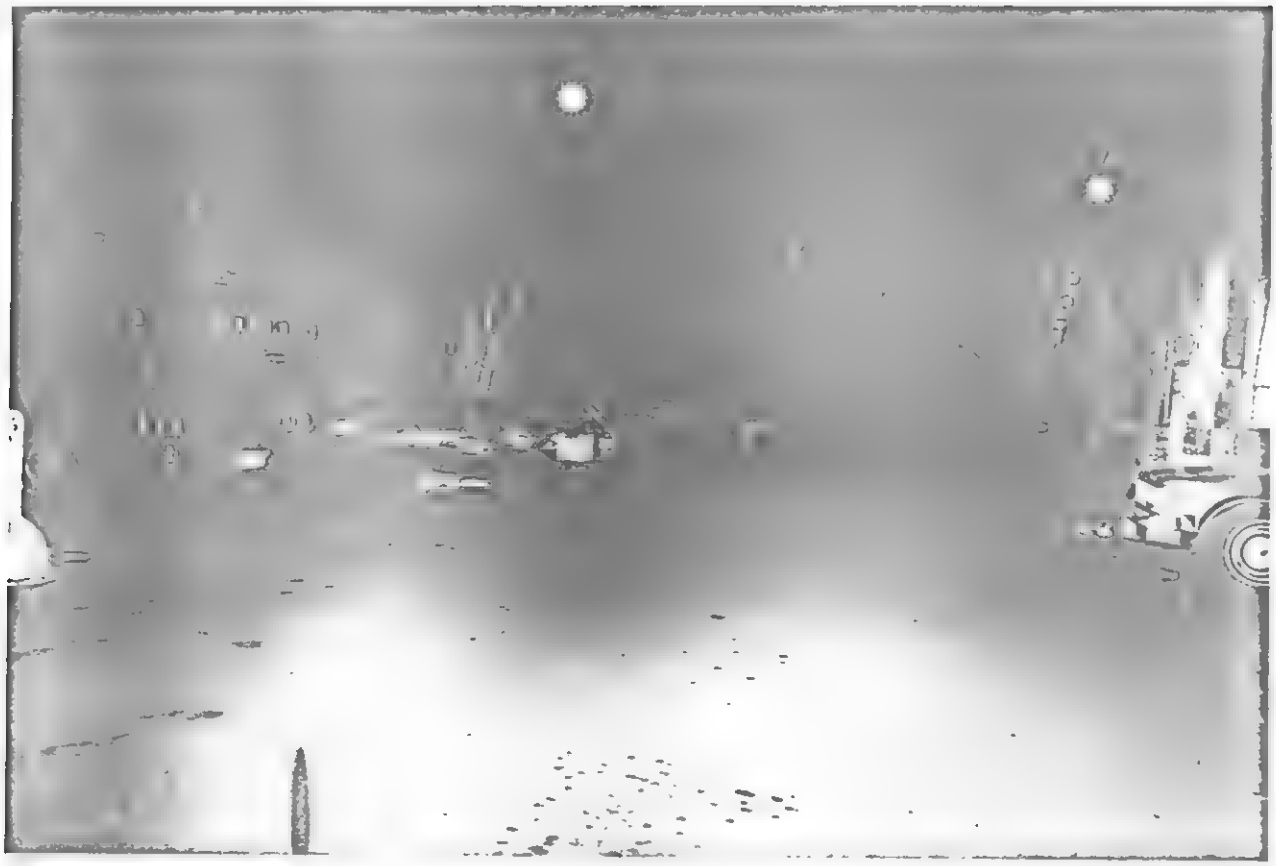
Vehicular entrance to ferry slips, viewed from ferry plaza.

Ferry plaza, as viewed from roof of Ferry Building, showing extent to which the plaza is used for parking.

Bronze statue of Samuel Sloan, first president of the DL&W Railroad, in the ferry plaza.

The Conrail Electrical Shop, at the northern edge of the terminal property, as viewed from the ferry plaza.

Vehicular entrance to ferry slip area, as viewed from the ferry plaza.



View looking north along roadway at ground floor, which parallels the river.

A grouping of several signal boards, replaced by the Solari time-table at the train concourse.as part of the terminal's rehabilitation. They are now stored on the ground level of the ferry building. One of these signal boards was retained at Track #1, where the glass skylights were also re-glazed.

Southernmost ferry slip A.

Ferry house between slips A & B (Supervising Control Room).

Ferryslip B.

Skylight over Slip B.

Ferryhouse between Slips B & C.

Ferryslip C.

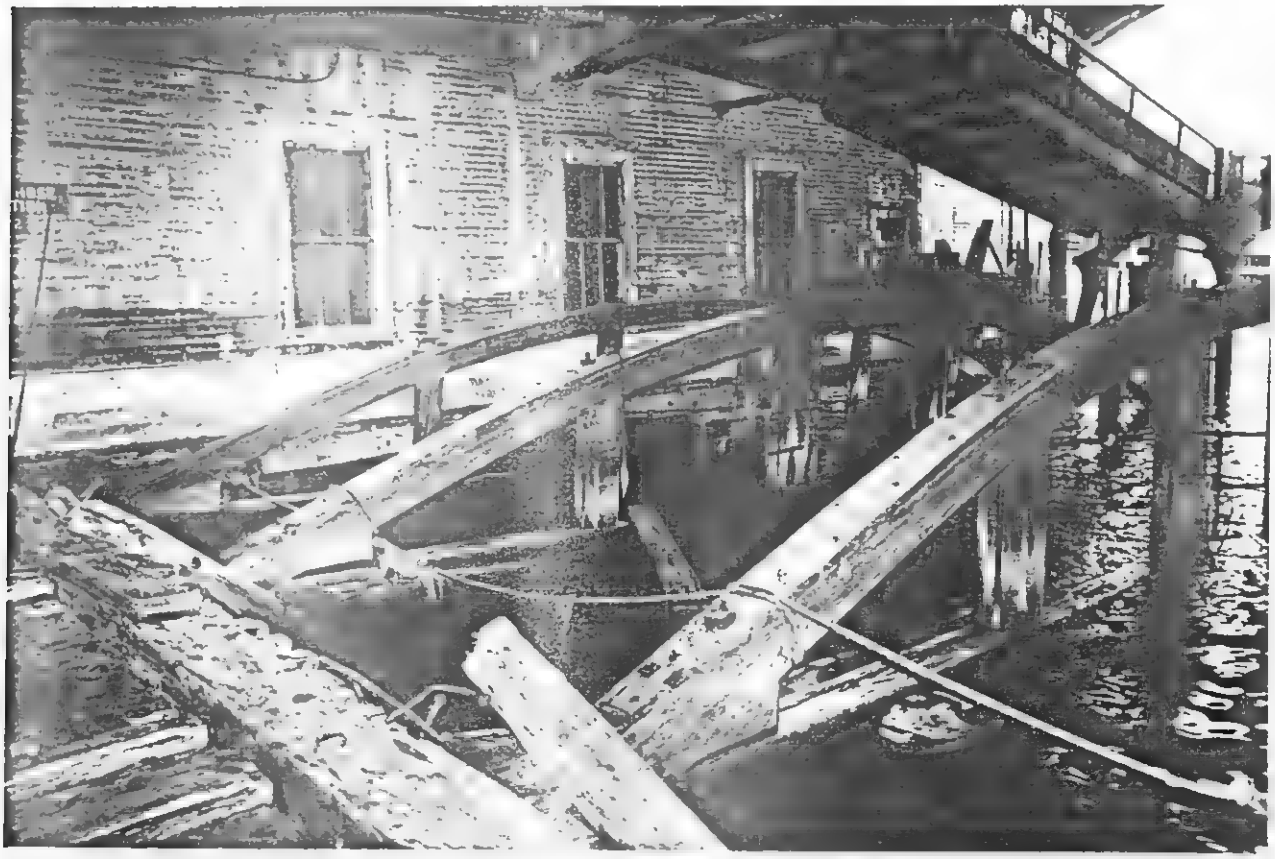
Ferryslip C slylight.

Ferryslip D.

Skylight over ferryslip D.

Submerged ramp of slip D.

Ferryhouse between Slips D & E.

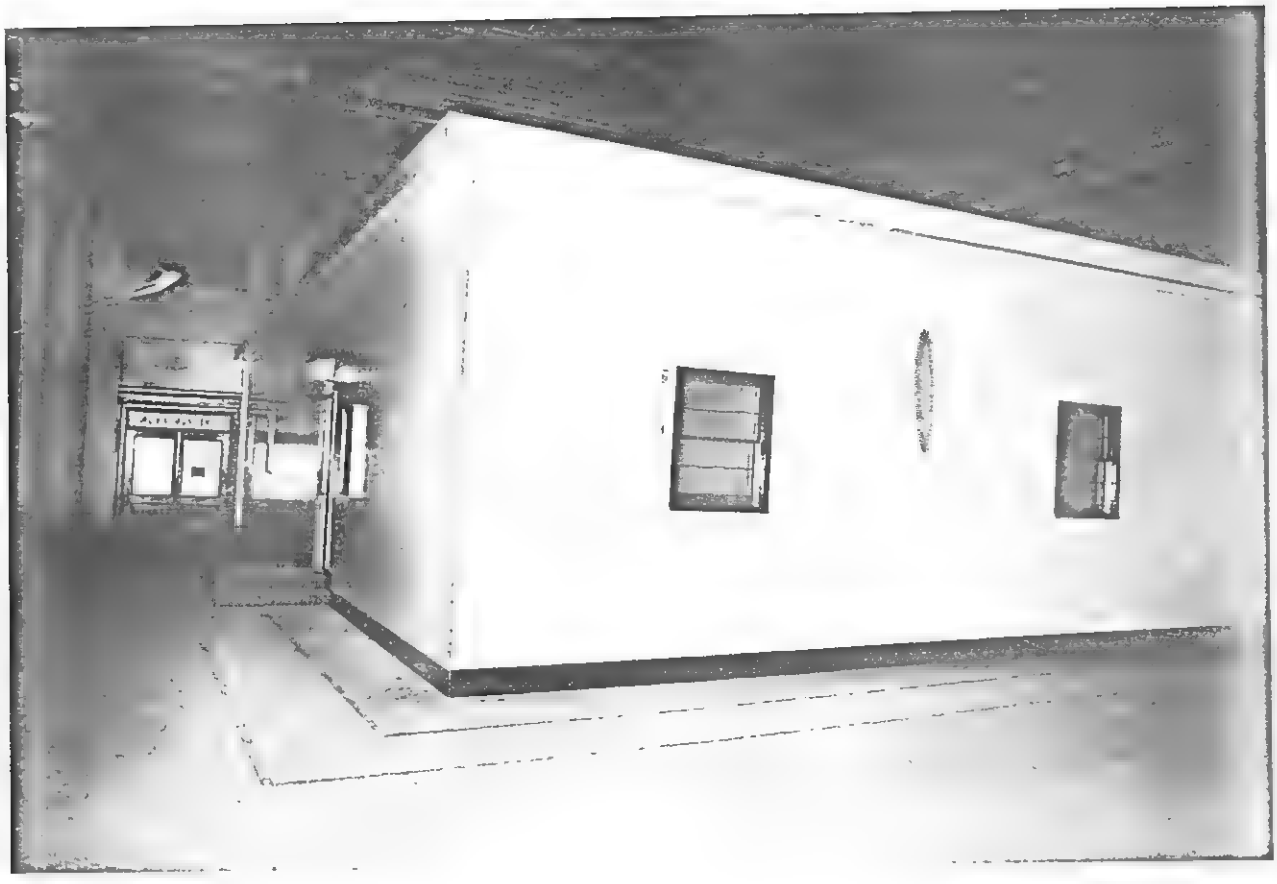


Ferry slip E.

Ferry slip E, detail of walkway around perimeter of ferryhouse.

Ferryhouse between slips E & F.

Ferry slip F, northernmost slip.



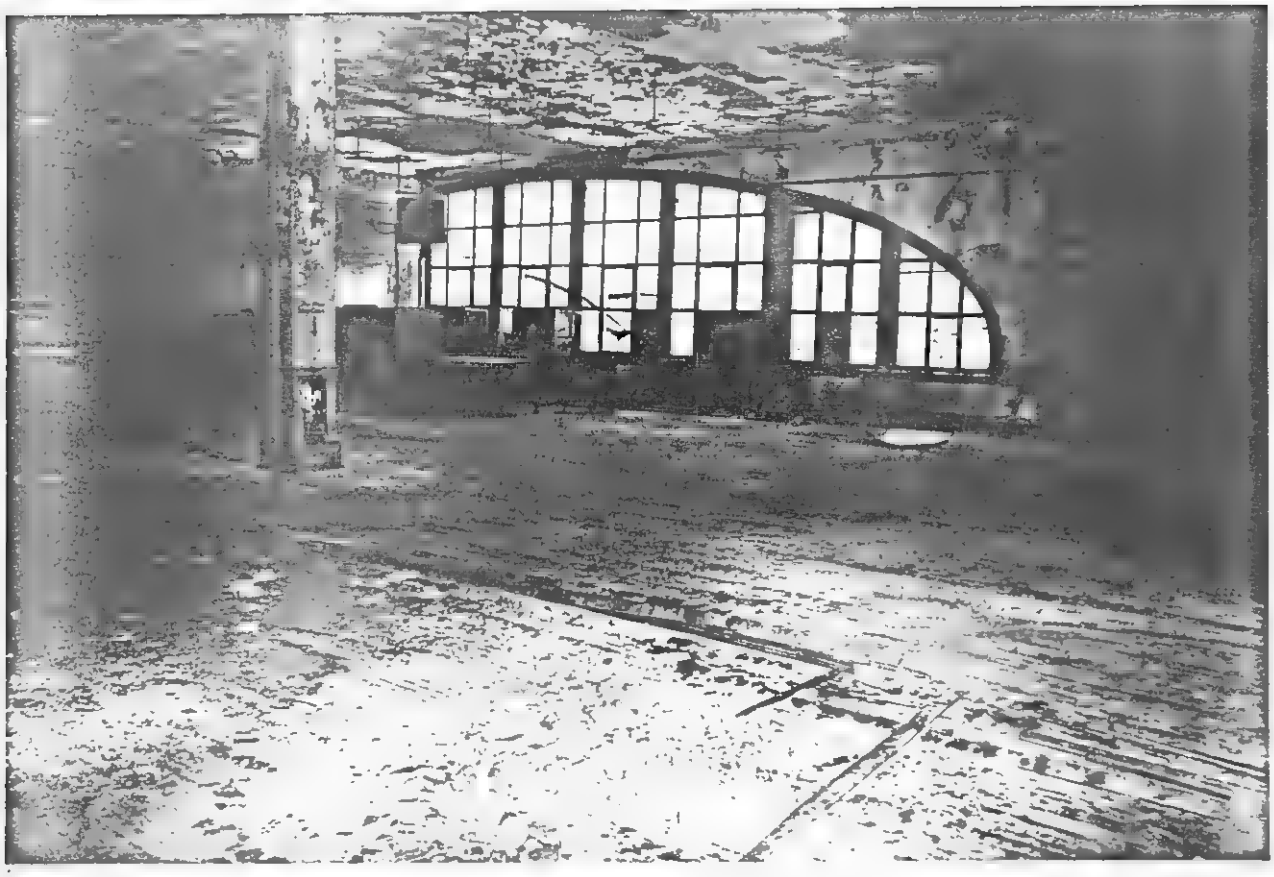
Second floor of ferry building; projecting building in foreground was built for Conrail offices in tethe ferry councourse area. This concourse leads to the stairway to the waiting room and the incl ned ramp to the train councourse.

Office projection for Conrail adjoins eastern wall of Slip A, as evident in the right of this view.

Typical view of paired pilasters of ferry concourse, which occur at the beams of the skylight areas of upper floor (other paired groupings have been removed).

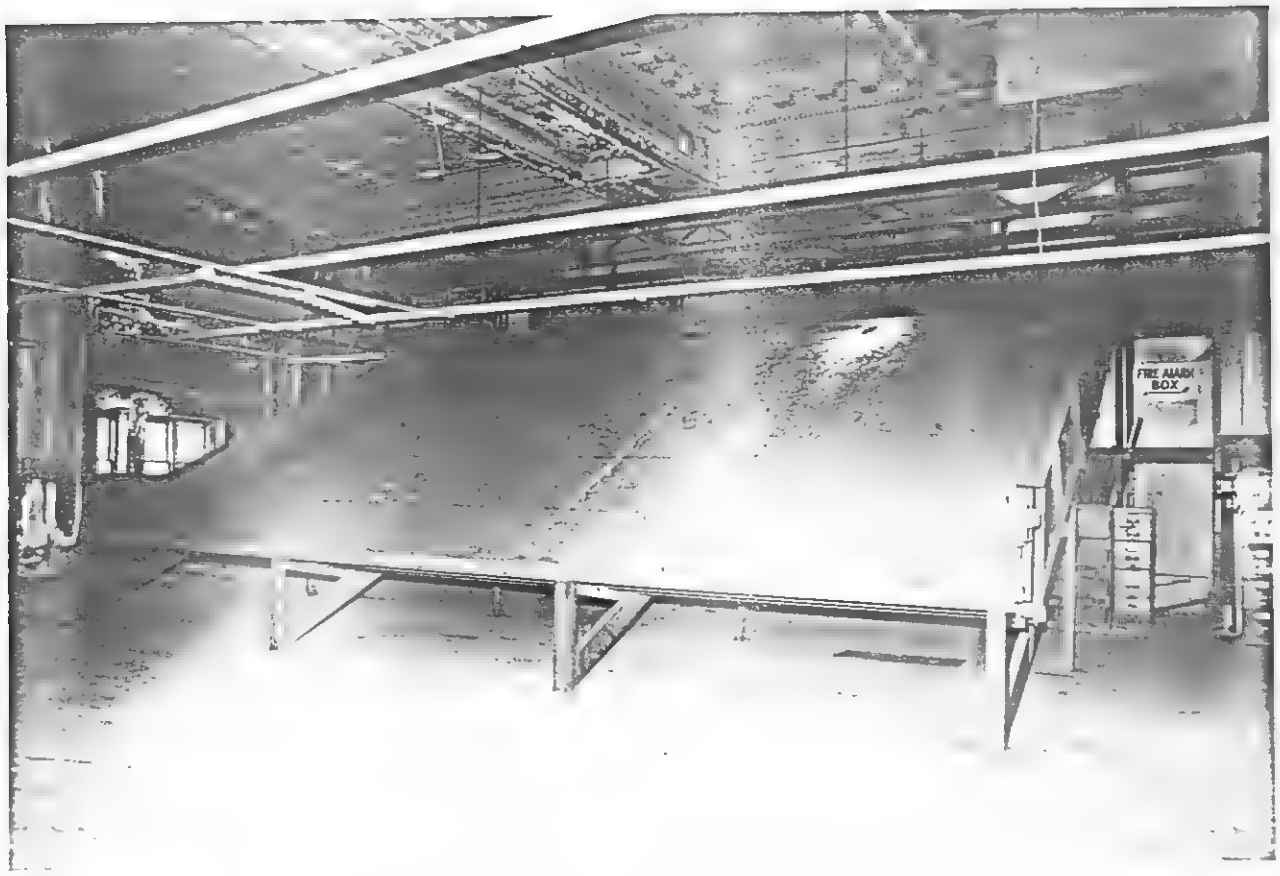
View looking north toward wall which encloses former post-office area. This space was originally an open concourse.

View looking north on second floor of ferry terminal. To the right are the entrances to the ferry slips; to the left is the walled-off portion of the ferry concourse.



Second floor of ferry building, northernmost room.

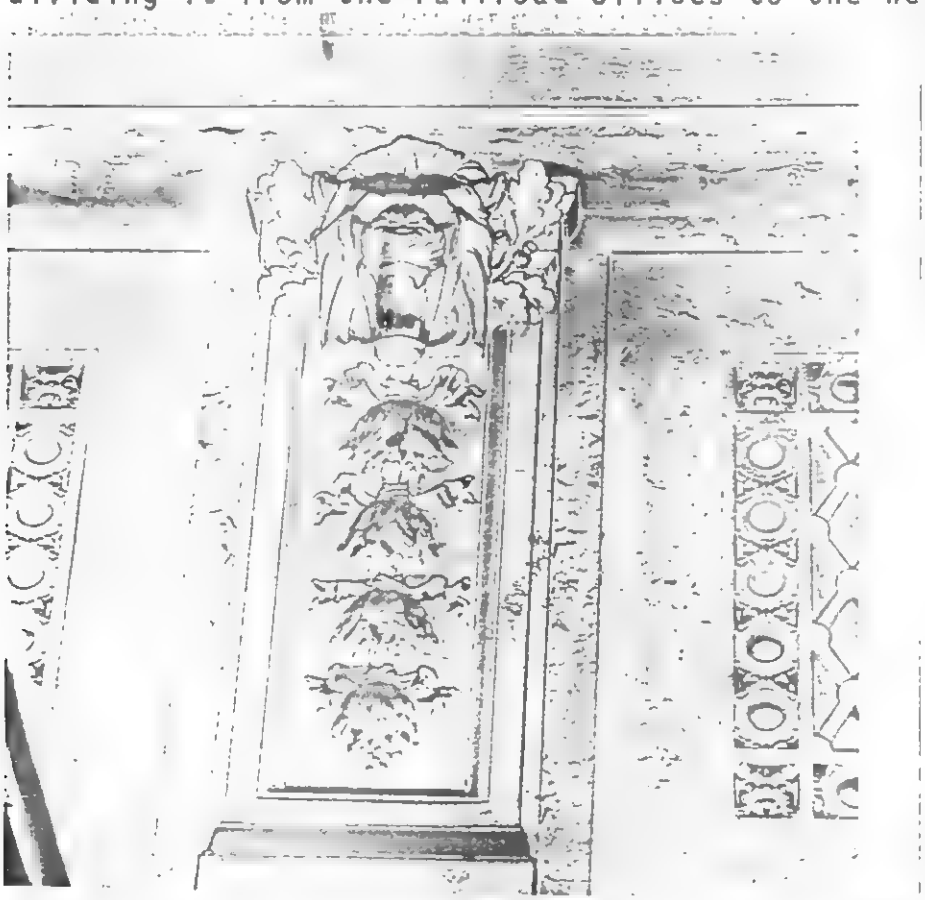
View looking west, toward room above (with mail sorting sign suspended over doorway).



Ferry concourse, northeastern area, with mail sorting apparatus.

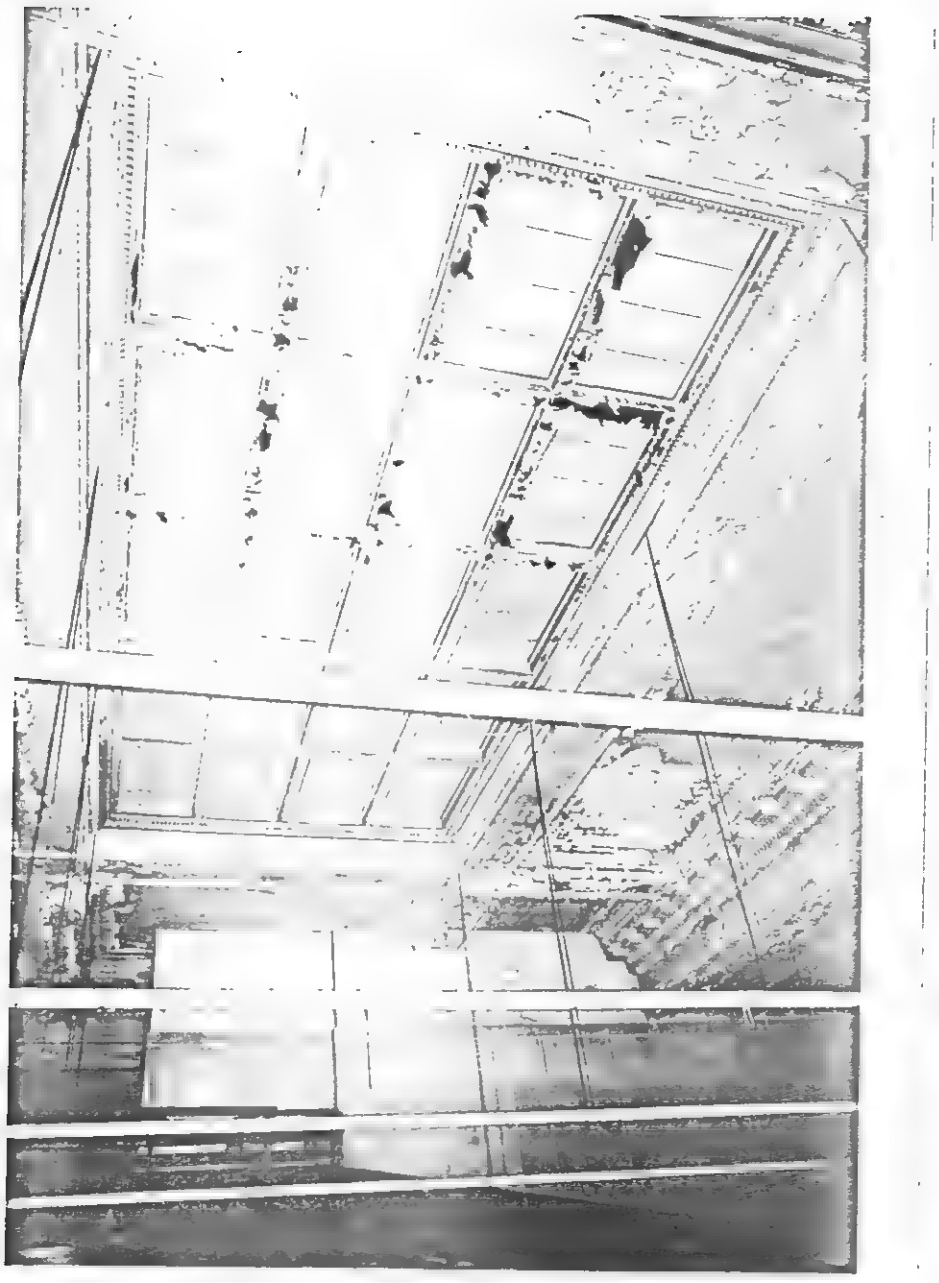
View from ferry concourse, looking south.

Ventilation grids appear on western wall of ferry concourse, dividing it from the railroad offices to the west.



Detail of bracket with lion's head motif between ventilation grilles of ferry concourse.

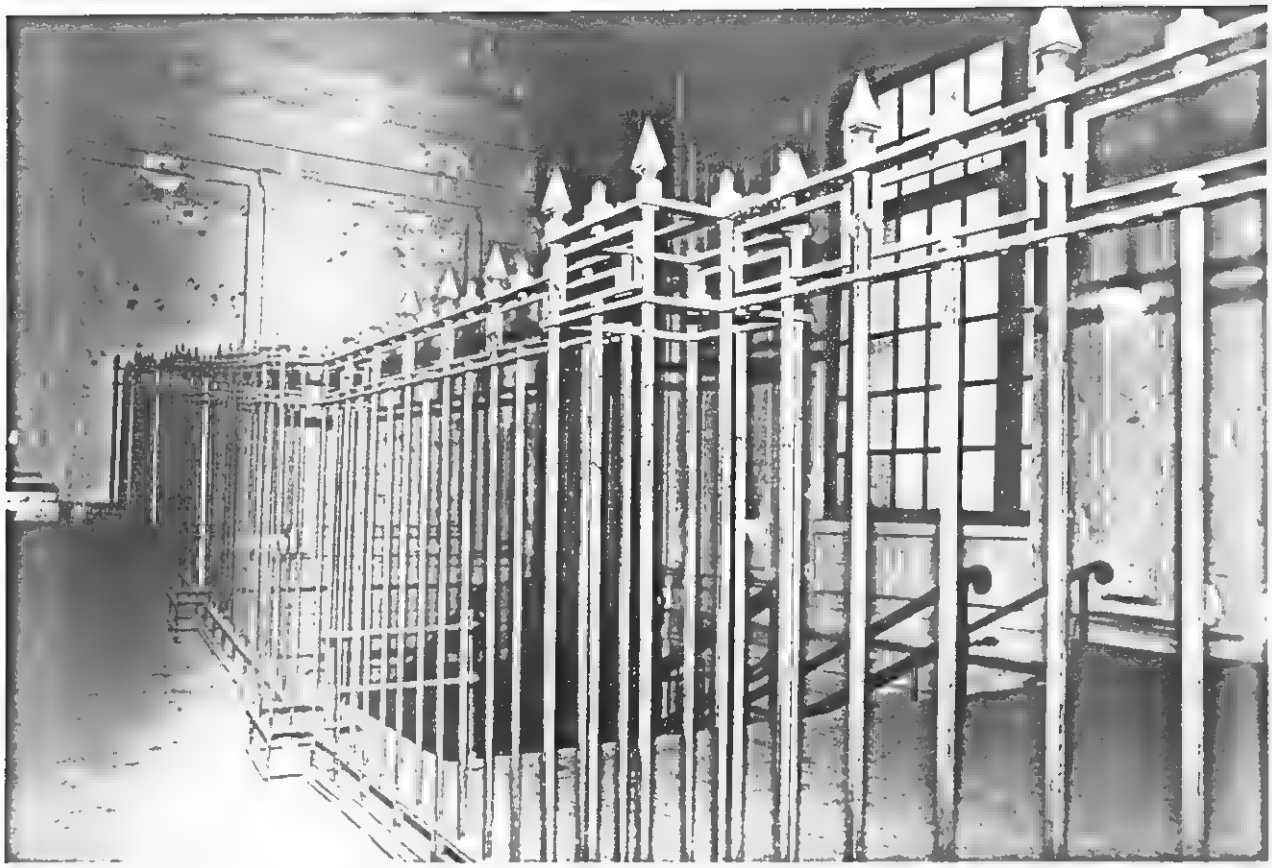
Detail of typical skylight above ferry concourse.



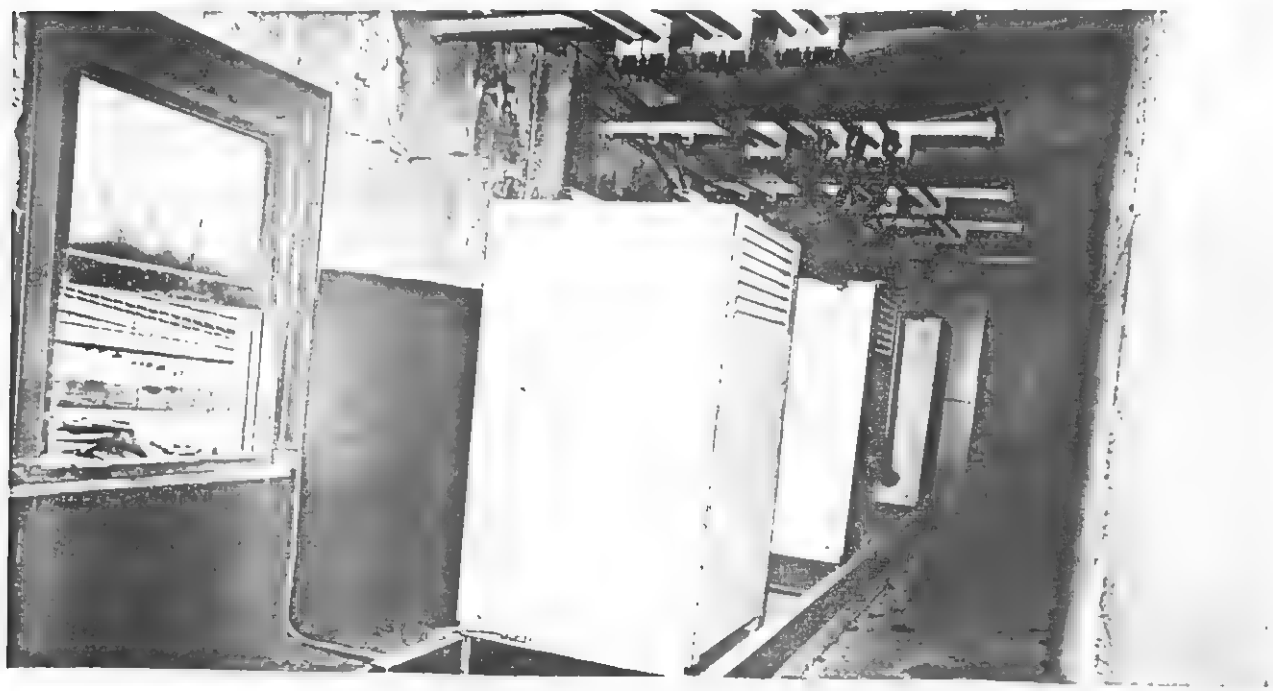
Typical skylight above ferry concourse; view looking east.

Passageway at second story of main waiting room building. Windows illuminate the corridor, which has steps leading down to the track level.

Iron railing separates stairway of corridor leading from ferry concourse to track level and ramp leading to YMCA Building.

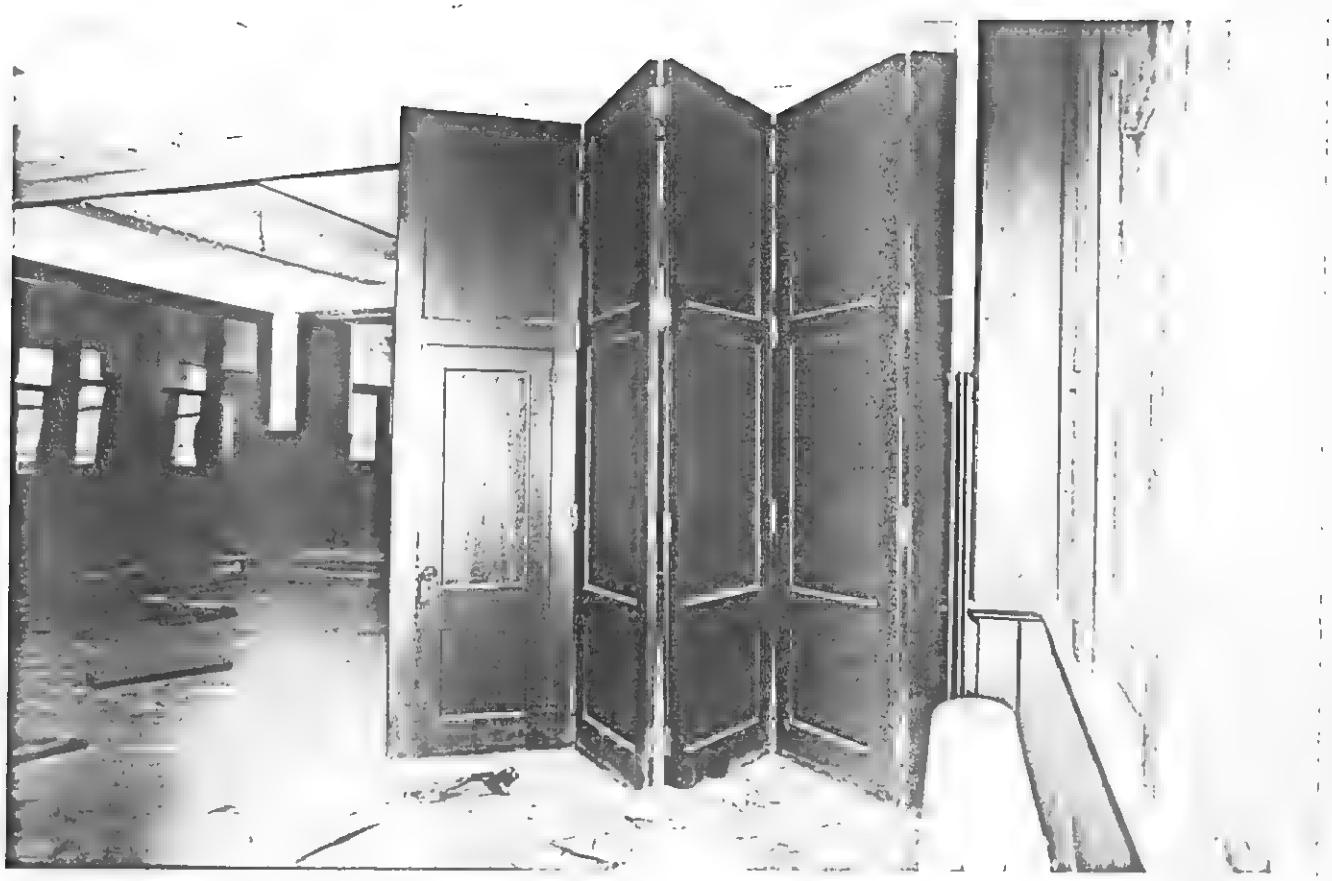


Stairway at second storey of main waiting room building leading to the track level.



At second floor of YMCA Building, condensors line the western corridor.

Second story auditorium/lunchroom at eastern end of YMCA Building, stage area.



Wooden sliding doors are intact in the stepped second floor of the YMCA Building auditorium/lunchroom.

Hall stairway at the second floor of the YMCA Building.

Typical view of YMCA Building hallways on the third and fourth floors.

Southern facade of terminal: to left, overall view; to right, projecting police office building, with facade of former restaurant visible above.

Slip No. 1: to left, shed-roof over slip; to right, classically-detailed dock building which is contemporary with terminal.

Detail of southern end of dock building on Slip No. 1,

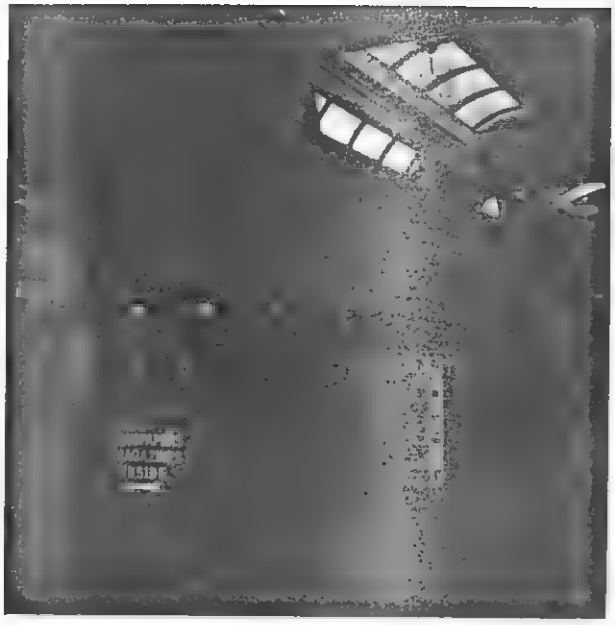
Views of the Immigrant and Pullman Building on Slip No. 1

Views of original lunchroom, opening off main waiting room.

View of vaulted original passageway leading from waiting room to second floor restaurant.

Second storey former restaurant, to left, view of wall facing south; to right, view of roof garden, once ovcovered by an awning, with views toward the New York skyline.

Interior of second story restaurant; a hung ceiling obscures an oval,plaster vaulted ceiling. This room is now used for administrative Conrail offices.



Train concourse, views running from north to south. Bracketted vestibules are oriauthentic features of the terminal.

Riverfront copper facade of terminal, as viewed from Slip. No. 1. Segments of missing copper reveal steel structure beneath. Ferry "bumpers" and pilings are evident in view to lower right.

IV. B. Recommendations for Repair and Reuse

Interiors:

1. Spaces off waiting room, such as vaulted hallway, former lunchroom, and on upper level, former restaurant, should be inventoried and considered for commercial reuse, based upon their architectural interest.

2. Wooden protruding storefronts in waiting room and along ferry concourse should be redesigned and monitored for unauthorized changes. Surviving authentic ornamental details, such as those of the vestibules leading to the waiting room should be retained.

3. Records Building should be at least partially devoted to a rail/ferry interpretation center, as it is a highly significant part of the terminal complex and houses records of the entire Lackawanna railroad.

Exteriors:

1. Ferry Building, and southern facade of main waiting room building, should undergo continued copper restoration. Glazed skylights over ferry landing areas should be re-glazed to protect structure.

2. Ferry slips, and Slip No. 1. These areas should be objectively surveyed to access their condition and function as shields to the terminal, as well as integral parts of the overall design of the complex.

3. The Immigrant/Pullman Building should be retained, given its special historical signficance.

4. Future development should include the replication of the original lighting scheme on the facade's perimeter.

5. Cobblestones of Ferry Plaza and Hudson Place should be retained when area is regraded.

Future New Construction:

1. Based upon research into previous structures near the terminal, a three-storey trolley terminal was located where the Transport of New Jersey bus depot was built. A building of similar height in that location, modelled upon the ornament of the previous building, would be an appropriate addition to this area. If constructed in this location, it could be architecturally joined to the western wall of the YMCA Building, as the original was. See Appendix C, photographs on pp. 126-128, showing northern facades of trolley terminal and an interior view.

V. Appendices

Appendix A. Text of Pertinent Historical Documents

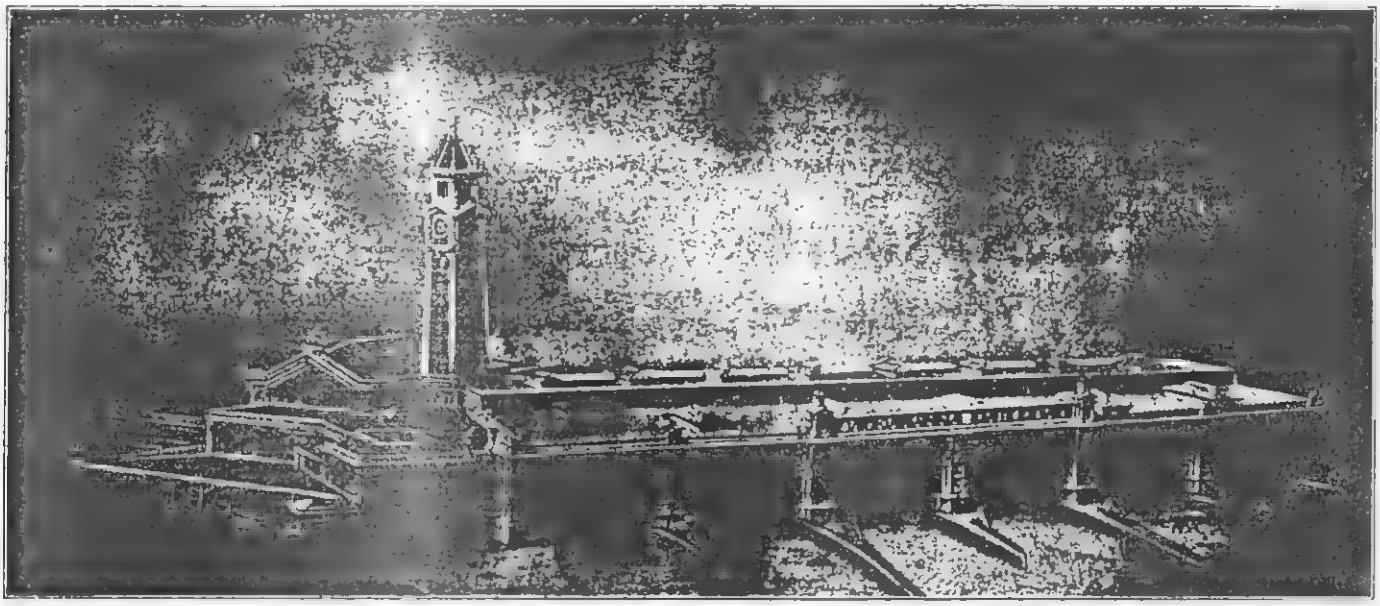
1. The following extremely descriptive article originally appeared in the Sept. 20, 1906 issue of Engineering News. It was reprinted by the Society for Industrial Archeology in 1972, and offers a condensed and complete description of the principal features of the terminal, as originally conceived.

THE NEW TERMINAL STATION AND FERRYHOUSE OF THE DELAWARE, LACKAWANNA & WESTERN R. R. AT HOBOKEN, N. J.

THE NEW TERMINAL STATION AND FERRYHOUSE OF THE DELAWARE, LACKAWANNA & WESTERN R. R. AT HOBOKEN, N. J.

By Charles C. Hurlbut.*

The new terminal and ferryhouse of the Lackawanna Railroad at Hoboken, N. J., now in course of construction, is a fireproof structure erected entirely over water and possesses some features unique in buildings of this class. The architectural effect of the new terminal may be gathered from the adjoining halftone view, the photograph of a complete model of the structure; the view is from the southeast, thus showing the ferry front of the building.



GENERAL VIEW OF NEW TERMINAL OF DELAWARE, LACKAWANNA & WESTERN R. R. AT HOBOKEN, N. J.
(From photograph of a model.)

The chief points of interest from an engineering and architectural standpoint are the concrete foundation supported on piles; the steel and concrete construction of the superstructure, designed with a special view to the resistance to shock and unequal settlement; the very extensive use of copper as an exterior finish and its mode of application, and the methods of erection necessitated by the conditions of traffic.

GENERAL PLAN.

The plan was controlled to a large extent by local conditions. About 600 ft. of the water front was available, bounded on the north by the steamship piers of the Hamburg American Line. As a large part of this frontage was occupied by the old terminal, through which about 100,000 people a day were passing, it was necessary to design the new building for construction in six consecutive sections, each of which could be opened for traffic before starting the succeeding one. A fire on Aug. 8, 1905, which totally destroyed the old terminal and ferryhouse, somewhat altered this plan, however, and the temporary buildings now in use were so placed as to facilitate the construction as far as possible. An elevated-track station was considered but rejected as impracticable owing largely to the steep grades that would be introduced by the position of the railroad yards and the tunnel through Bergen Hill, only a short distance away.

The number of passengers carried by the three ferries entering the terminal in the first six months of 1906 was 17,200,000, which means a daily average of 94,800. As the number carried on Sundays and holidays, however, is much less than on week-days, the week-day average is something over 100,000. Of this number something less than half are railway passengers, and the others are distributed by the trolley lines terminating at the station or pass direct to the street. The great bulk of this traffic is concentrated into a few hours in the morning and late afternoon. The ferryhouse provides for three separate ferry-lines, each with two slips, equipped for double-deck boats. To separate and prevent congestion of these many lines of traffic, to provide for rapid loading and unloading of boats, to make the entrance and exit of ferry-passengers as short and direct as possible, and (not least) to prevent "beating the ferry" were the main controlling factors in the plan of the ferryhouse portion of the terminal.

The requirements of the railroad station were: Ample waiting-room facilities for passengers waiting for trains and for boats, including provision for housing safely as many as 20,000 people at one time, which might become necessary in the event of the disability of the ferry for an hour or more in the morning rush hours; Restaurant, lunch-room and kitchen; Storerooms for the dining car and commissary departments; Offices for the division superintendent, train dispatchers, ferry superintendent, baggage master, auditor and other officials; besides a barber shop, toilets, hospital room and the other usual adjuncts of a terminal railroad station.

The disposition of space to meet these various requirements is clearly shown on the general plans reproduced in Fig. 2. Eastbound passengers from trains pass from the train concourse either (1) up a 10% incline just south of the Main Waiting Room, to the ferry concourse on the second floor and thence to the upper deck of the boats, or (2) through the eastbound waiting-room and team concourse to the lower deck of boats. Subsidiary waiting-rooms are provided on the first floor, for the convenience of passengers, between the ferry slips. Eastbound ferry passengers enter the ferry waiting-room and pass direct to the boats, or by means of stairs to the ferry concourse. Westbound passengers pass direct to the street by practically straight exits from the lower deck of boats; or, from the upper deck, enter the

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Reprinted from Engineering News Vol 55 No. 12 September 20, 1906 pages 297-304
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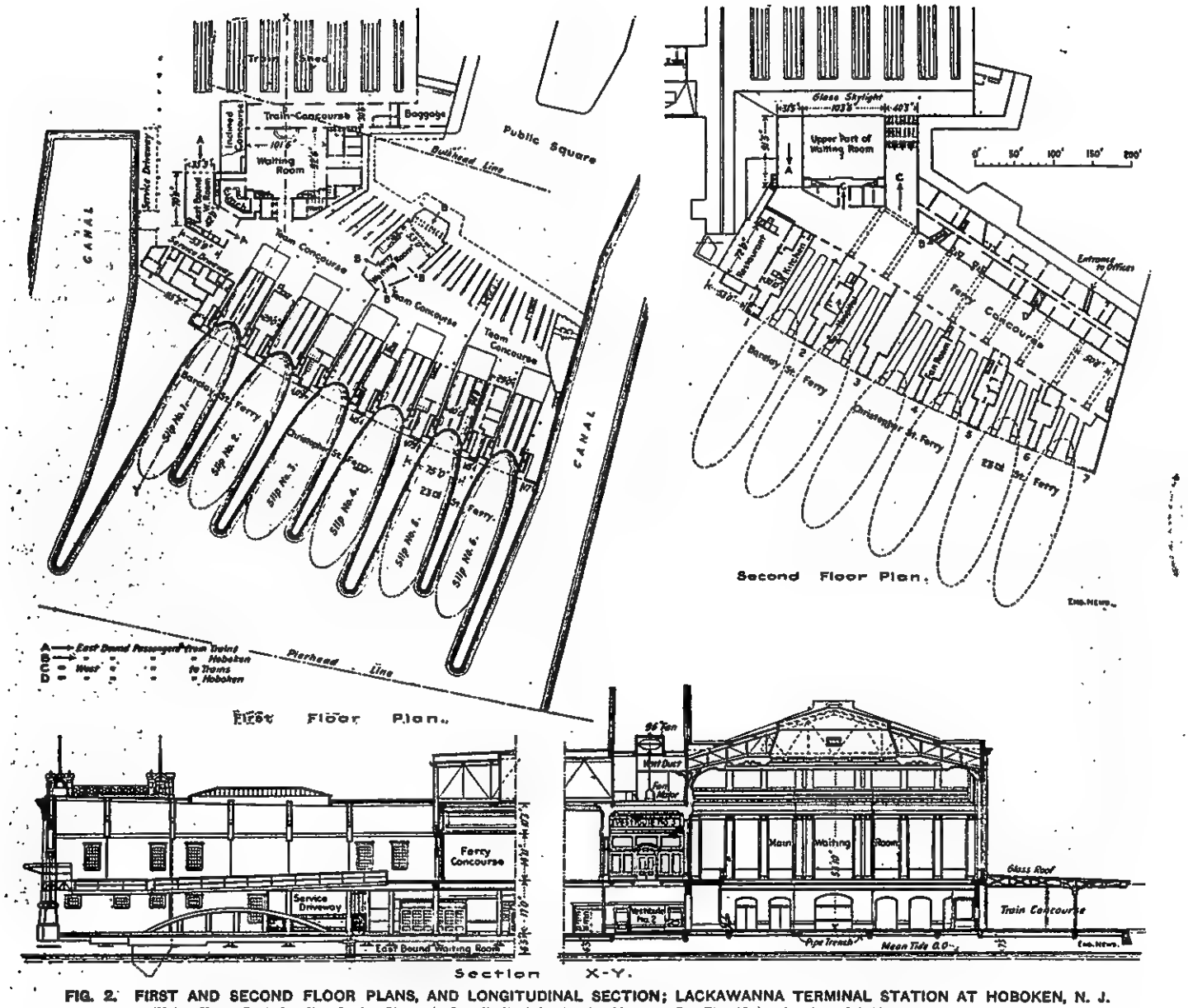


FIG. 2. FIRST AND SECOND FLOOR PLANS, AND LONGITUDINAL SECTION; LACKAWANNA TERMINAL STATION AT HOBOKEN, N. J.
(Note.—Upper Deck Landing Bridge Shown in Longitudinal Section is old type. See Fig. 13 for drawing of bridge actually used.)

ferry concourse, and thence pass to the street by easy stairways. Passengers to the trains go to the trainshed by way of the westbound concourse, which leads off the Ferry Concourse along the north of the main waiting room and terminates in a stairway 40 ft. wide, or pass into the main waiting-room by a marble staircase. Provision is made in the plan for a future arcade from the ferry concourse to the trolley terminus about 200 ft. away.

The main waiting-room for westbound (outgoing) train passengers is 90 ft. × 100 ft. in plan, and 58 ft. 10 ins. high, with large windows on all sides and a large skylight overhead. The ferry concourse is 70 ft. wide, 470 ft. long and 28 ft. 3 ins. high, lighted by large skylights. This concourse is flanked by rows of twin columns supporting deep beams which divide the main part of the concourse into seven panels, forming its most distinctive decorative feature. The restaurant is 72 ft. × 53 ft. The total river elevation is 506 ft. 2⅛ ins. long. The train concourse is 307 ft. long and provides for fourteen tracks. The baggage room (for Hoboken baggage only, New York baggage being checked at the New York ferry terminals) is practically a separate building and opens on the train concourse.

The train concourse is entirely covered with a roof of wire glass supported on steel trusses and purlins. The sidewalk along the entire street front of the building is covered by a marquise of similar construction.

A two-story building to serve as immigrant station and as depot for the supply of Pullman cars is located at the head of the short canal just south of the main terminal. This building is indicated in the Second Floor Plan (in Fig. 2). The Service Driveway and the Immigrant Track are arranged with reference to the location of this building.

Structural and Ornamental Design.

GRADES.—The floor level of the ferryhouse was fixed by the height of the first deck of the boats above the water under ordinary loading, namely 6 ft. 5 ins., and that level was therefore adopted as the general level of the ferryhouse floor. The level of the railroad station was determined by the height of the tracks, and that floor was accordingly fixed at 7 ft. 5 ins. above mean tide. The change from one grade to another is made by easy inclines. The level of the tops of piers is in all cases 8 ft. 2 ins. above mean tide. This is 8 ins. above high tide and as close to the floor construction as was possible and allow the necessary spread for the column bases.

ARCHITECTURAL DESIGN.—The most notable feature of the building as one approaches from the river is the clock tower, which rises to a height of 203 ft. above mean tide to the base of the flagpole. The six ferry slips are spanned by arches, supported by ornamental piers, as shown in the view on the preceding page. The base of the piers and also the base of the restaurant wing is of faced concrete; above this level the entire structure, including the tower, is covered with copper-work. The west or street elevation of the ferryhouse portion has five bays, surmounted by pediments, and is also of copper. The baggage room building and the first story of the north elevation of the railroad station are of Indiana limestone with copper-work above. The ornamental details of the copper-work were carefully studied with a view to preserve the character of the material and give a "metallic feeling" to the design. Details and moldings usual in stonework cannot be copied successfully in sheet-metal without modification, and all appearance of an attempt to imitate stone or other material was carefully avoided. The interiors will be finished for the most part in plaster and while not ornate in treatment will follow the modern French school. The first story walls of the main waiting-room are of buff limestone.

STRUCTURAL DESIGN.—The entire terminal building with the exception of the baggage room

wing is built over water of a depth of about 20 ft., overlying from 70 to 75 ft. of mud. Under the mud is a bed of sand and gravel of varying thickness, and rock is encountered at a depth of from 110 to 120 ft. below mean tide. The general requirements of the case called for a permanent, fireproof structure, sufficiently flexible to permit of slight inequality of settlement without serious damage and yet sufficiently rigid to withstand the shocks of the ferryboats, and as light as possible. The type decided upon was a riveted steel framework enclosed entirely in concrete. All the stresses are figured as taken up by the steel.

FOUNDATIONS.—The typical foundation is clearly shown in the vertical section in Fig. 3. Each column is supported on a group of from 9 to 25 piles of long leaf yellow pine from 80 to 90 ft. long. The pile loading is about 8 tons maximum. The piles are cut off at low water and capped with 12 × 12-in. timbers, upon which is laid a solid flooring of 12 × 12-in. alternating with 12 × 8-in. timbers. As the average height of tide (between high and low water) is 5 ft., the woodwork is entirely submerged about two-thirds of the time and is always wet, so that the danger of decay is eliminated. In the waters of the North River it is unnecessary to take precautions against the teredo or limnoria, as the presence of these pests has not been discovered in any piles driven in these waters within the last twenty years. This statement is based on the experience of the engineering departments of the Delaware, Lackawanna & Western R. R. and the New York City Department of Docks & Ferries; the fact is explained by the presence of sewage in the water. In each grillage as described above, two or more timbers of each course are continuous through two or more footings, as shown in the plan in Fig. 3. The footings are therefore securely tied together in two directions, effectually preventing any lateral displacement of any individual footing. The whole

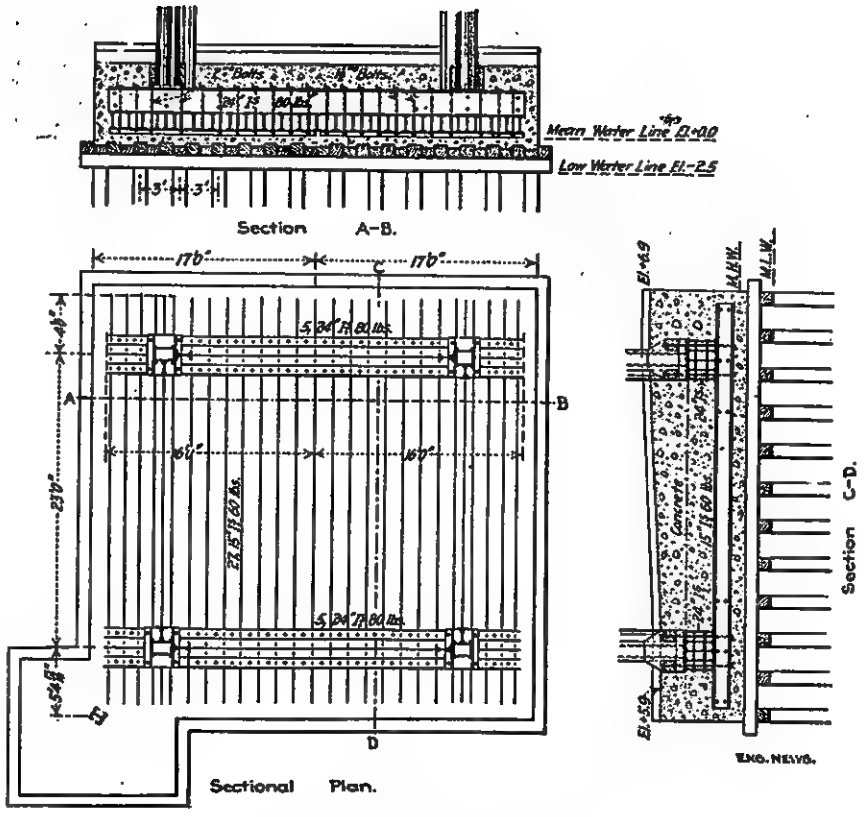


FIG. 4. FOUNDATION OF TOWER.

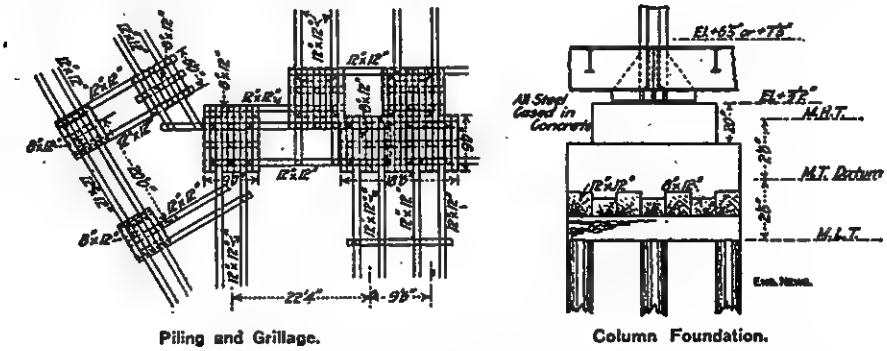


FIG. 3. TYPICAL COLUMN FOUNDATION, AND PART PLAN OF PILING AND GRILLAGE, SHOWING METHOD OF TYING TOGETHER THE PIERS.

timber structure is securely bolted together. On the platforms described were built concrete piers which were leveled off for the columns 3.15 ft. above mean tide. Anchor bolts were built in to secure the columns, and under the heavier columns the concrete piers were reinforced with grillage of steel beams.

The foundation of the tower, Fig. 4, differs from this arrangement because the tower was designed to rest on a single foundation block in place of four separate footings, in order to avoid all risk of unequal settlement. The area covered by the tower foundation is closely piled and a two-course timber grillage built over the piles. The concrete pier constructed on this grillage extends to within 4 ins. of the finished floor, or 6 ft. 1 in. above mean tide; it encloses a steel grillage of two courses of I-beams, 15 and 24-in., securely tied together by steel angles and bolts. The four tower legs rest on the upper course of grillage beams, the column footing thus being imbedded in the foundation concrete.

All foundation piers (except that of the tower) are formed with offsets or shoulders around the outside, adapted to serve as a footing for hydraulic jacks to allow of raising the columns in case of undue settlement; for the same purpose inverted stiffeners were placed above the girder connections of the first floor, strong enough to take the entire dead load of the column above the first floor, except where the girder connection itself was strong enough to take this load. After placing the steelwork of the first section the column footings settled about ¾-in., and after the concrete of walls, floors and roof was placed a further settlement was found, ranging from ¼-in. to 2⅛ ins. The tower foundations settled ¾-in. after placing the concrete pier; this was taken up with steel plates before setting the steelwork. After the erection of the steelwork a further settlement of ⅞-in. was found, uniform over the whole area of the tower base.

The general type of the foundations was developed by the writer, with the cooperation of Mr. E. W. Stern, the consulting engineer of the work. The pile loading was fixed by the engineering department of the railroad company, which also worked out the plans of the foundations in detail and carried out their construction, under Mr. Lincoln Bush, Chief Engineer.

FLOORS AND ROOFS.—The floors and roofs throughout the building are of reinforced concrete, Columbian type, supported on steel beams and girders with riveted connections. The beams are spaced from 5 ft. to 7 ft. on centers. The first floor is of stone concrete and the second floor and roof are of cinder concrete, both being mixed in the proportion 1:2½:5. The first floor of the ferryhouse and the service driveway are designed for a maximum concentrated load consisting of a truck weighing 15 tons on a 5 ft. × 10 ft. base. Other floors are designed for live loads of from 90 to 120 lbs. per sq. ft. It will be noted from the drawings that the first-floor girders are riveted to the columns and do not rest on the concrete footings, and as stated above these connections are in all cases made

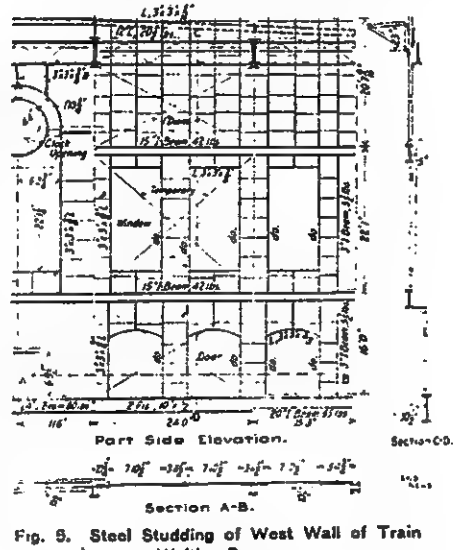


Fig. 5. Steel Studding of West Wall of Train Waiting-Room.

(This is typical of the wall-framing throughout the Terminal.)

sufficient to support the dead weight on the column.

WALLS.—The outside walls and the walls of the ferry slips and team concourse are 8 ins. thick, of cinder concrete reinforced with vertical 3-in. I-beams about 4 ft. on centers, which are bolted at the top and bottom to wall beams and are stiffened with frequent tie rods. Fig. 5 gives an idea of how this metal studding is arranged in the case of one of the large unstiffened walls. All openings are framed out with angle irons or 5-in. channels. The concrete bases of the river piers and the base of the restaurant wing consist of faced stone concrete and are considerably thicker. All the cinder-concrete walls are covered with sheet metal which is secured to the concrete by bolts passing entirely through the wall (nailing is not permitted); on outside walls this is 18-oz. copper, on other walls it is No. 22 galvanized iron siding of clapboard pattern. The construction of the minor partitions is noted farther on under Finishing Materials.

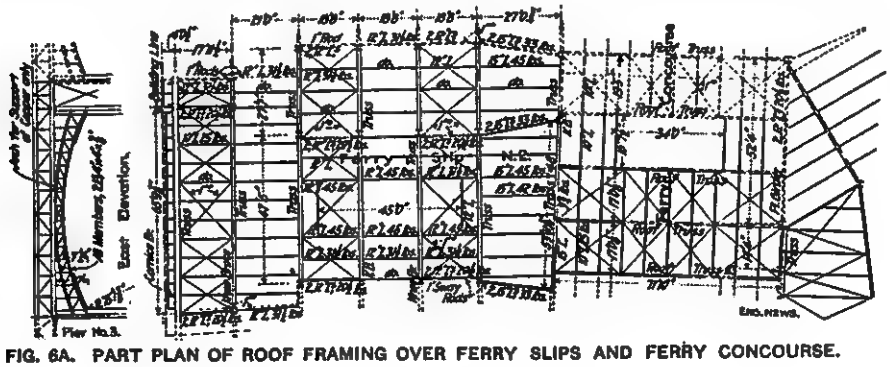


FIG. 6A. PART PLAN OF ROOF FRAMING OVER FERRY SLIPS AND FERRY CONCOURSE.

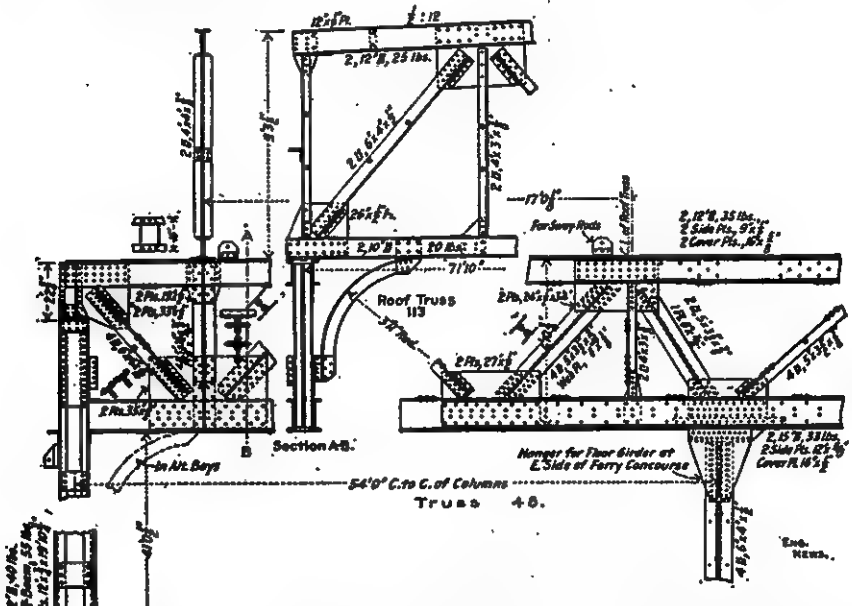
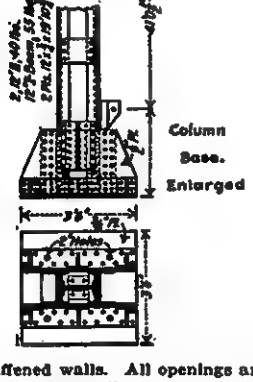


FIG. 6B. ROOF TRUSS OVER FERRY CONCOURSE AND LONGITUDINAL TRUSS BETWEEN FERRY SLIPS AND CONCOURSE.



STEEL FRAMEWORK.

All the steelwork throughout the building, including the girders, beams, column bases and the cast-iron pedestals under the Main Waiting Room floor, and excepting only the main roof trusses, is entirely incased in concrete. The main roof trusses are protected from fire by suspended ceilings plastered with Portland cement mortar.

Fig. 6-a, giving a part plan of the framing, illustrates the general arrangement of the steelwork. A noticeable feature of the steel framework is the method of connection and bracing of trusses and girders. As stated above some irregularity of settlement must be looked for in a building of this area, and for that reason rigid connections were avoided as far as possible. The roof trusses in nearly all cases rest either on the tops of columns or on the top flange of longitudinal girders as illustrated in Figs. 6 and 7. The bracing is effected by heavy curved knee braces which resist as curved beams and not as struts, and will continue to act as braces even after some displacement of steel occurs due to settlement, whereas a rigid connection would be torn apart and fail utterly. The connection of the trusses over the main waiting-room is an exception to this rule (Fig. 8), as these trusses are riveted to the sides of the columns; but the length of the columns in that case is considered to offer sufficient flexibility.

Except in the tower, no diagonal framing is used in the walls, in order to carry out this scheme of flexibility. But abundant provision was made for temporary sway-bracing; connection plates for 1-in. diagonal rods riveted to the columns were provided (see Fig. 7) instead of letting the bracing during erection rely on makeshift connections. Sway-rods of 1-in. round steel were called for as part of the material, and the drawings called for connection-plates in a sufficient number of panels to make certain of early bracing no matter where the erection might be started.

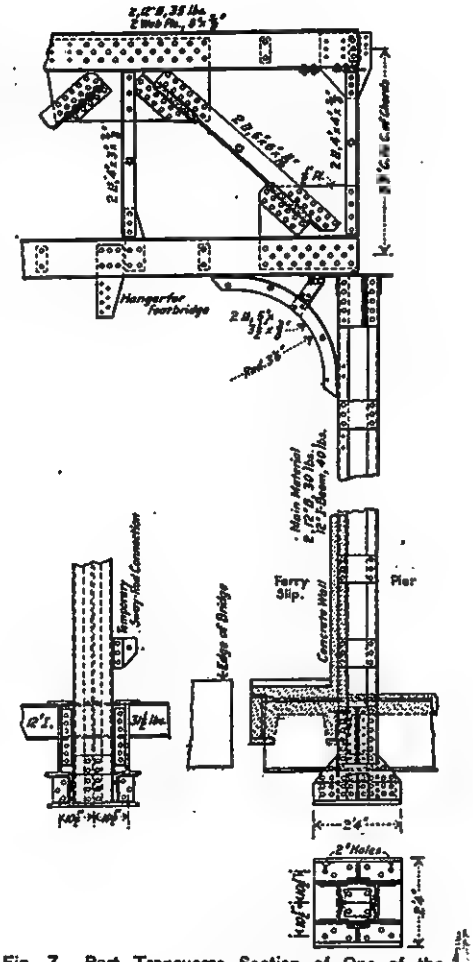


Fig. 7. Part Transverse Section of One of the Ferry Slips, Showing Steel Framing.

The tower, Fig. 9, is a steel skeleton covered with ornamental copper which is reinforced with small angles and bolted to the steelwork. The tower is not enclosed in concrete walls. It contains a clock and a 2,500-lb. bell; otherwise its purposes are purely ornamental. It is separated from the building proper by a concrete floor at the roof level.

The steelwork of the floors is generally simple. The special connections of the first floor girders

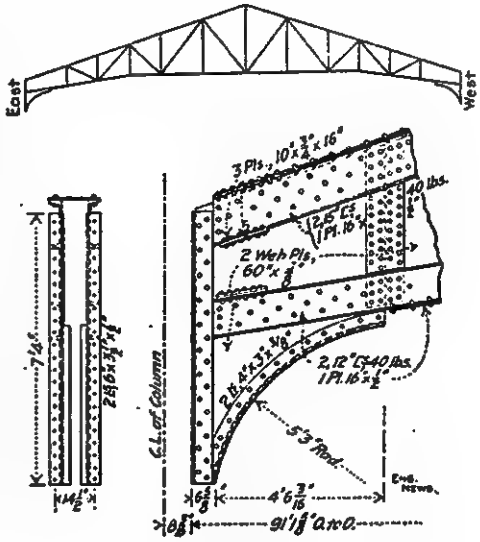


Fig. 8. End Section of Roof Truss Over Train Waiting-Room.

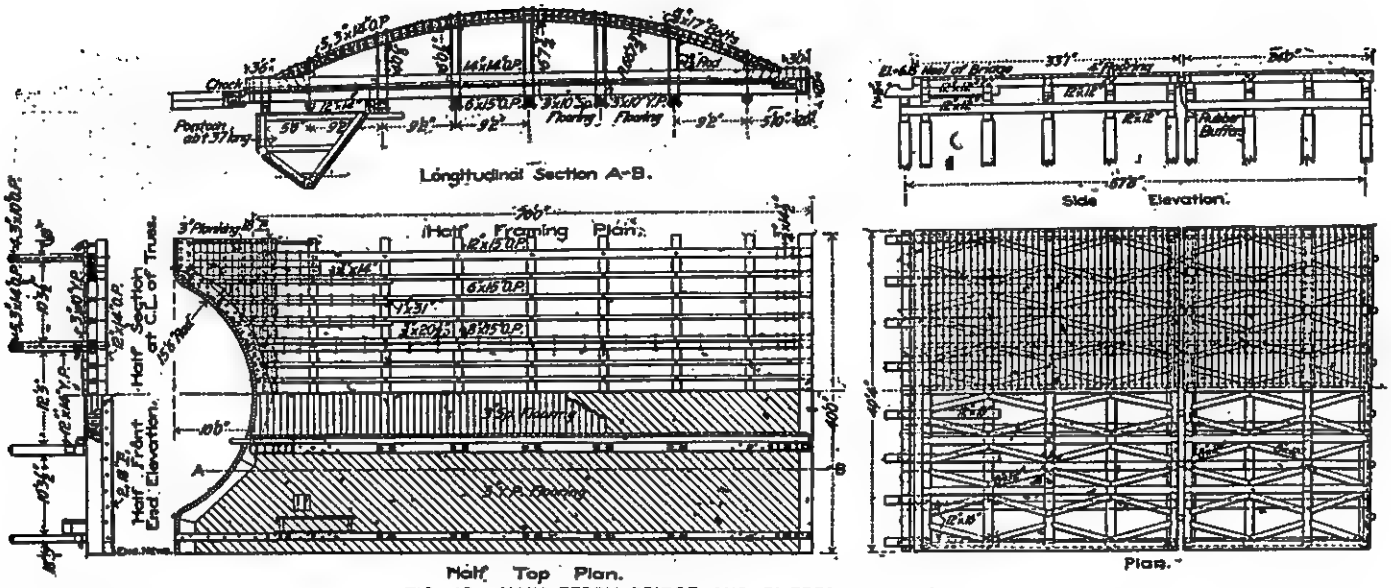


FIG. 12. MAIN FERRY BRIDGE AND BUFFER PLATFORMS.

and applied, for the purpose of reducing the danger of settlement cracks as far as possible.

COPPER WORK.

The ornamental copperwork of the exterior merits special attention. Holes for attaching the copper are left in the concrete by inserting rods through holes bored in the centering laid out accurately by template. The copper is formed in the shop to the architectural designs and reinforced with strap iron riveted to it on the back which is punched to correspond with the holes in the concrete. The sheets are then bolted to the concrete with copper-headed bolts, and all bolt-heads and seams are soldered. The pilasters of the east and west piers are formed out in the concrete to give a solid backing for the copper. Other pilasters, however, and the greater part of the projecting courses and moldings are merely formed in the copper, reinforced with steel angles and straps. Wood planking, supported on steel lookouts, is used under the gutters and cornices, but otherwise no woodwork is used for the support or attachment of copper-work. The copper-work of the tower has already been described above. Wherever copper and galvanized iron are in conjunction they are separated by felt and red-lead to prevent electrolysis. The copper-work is being furnished and erected by Herman & Grace, of Brooklyn.

FIRE PROTECTION.

The structure of the building itself is considered thoroughly fire-resisting, but ample provision was made to guard against damage to the contents and passengers by providing metal-covered doors and hollow metal window frames and sash with wire-glass at all exposed points. This was done on the north and south sides and in the ferry slips, which are the only outside fire exposures, and also in rooms where inflammable material might be stored. The danger of panic was considered as well as the risk of property damage, and consequently all waiting-rooms and passenger concourses were separated from offices or store-rooms by fireproof doors and windows.

The building will be further protected by a system of wet firelines and stand-pipes having 38 2½-in. outlets each provided with a reel and 50 ft. of hose. There are also three permanent turret nozzles on the roof, similar to those in use on fireboats, which are capable of throwing a stream to any point of the roof.

This system is in connection with a system of underground fire-lines which extends throughout the company's yards, and is supplied by an automatic high-pressure pump in the power-house. The main lines within the building are 6-in., with 3-in. branches to the various hose connections. The outlets are so placed that every point in the building may be readily reached with a

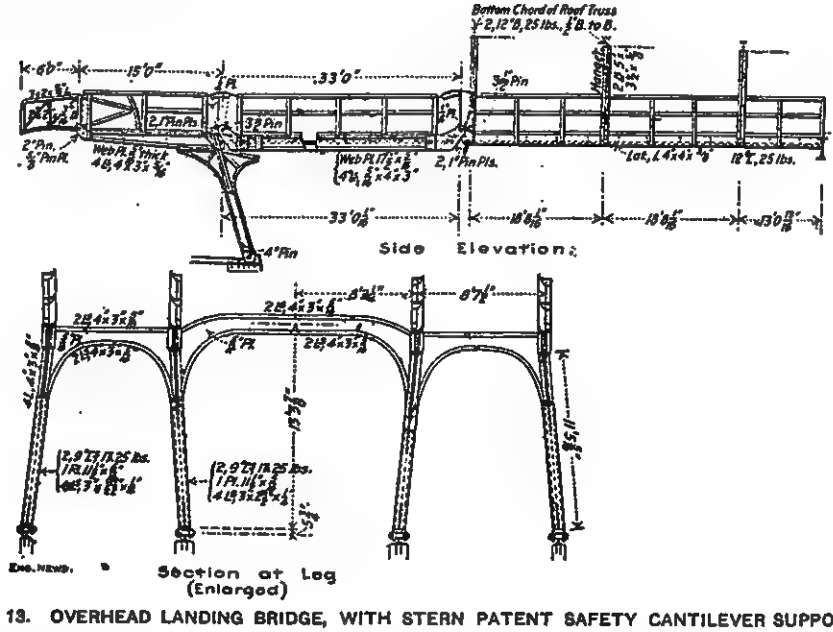


FIG. 13. OVERHEAD LANDING BRIDGE, WITH STERN PATENT SAFETY CANTILEVER SUPPORT.

stream. Two hose connections are also placed on the outside of the building between the ferry slips, and controlled by valves within the building, but operated from the outside to prevent freezing. There are three siamese connections on the river-front for fireboats and one on the street for a fire-engine to provide auxiliary pressure in case of necessity. These are dry, and are protected by check valves inside the building. All lines are thoroughly protected from freezing, and the main line on the east side of the ferry-house is run in the warm air duct for this purpose. This duct is described elsewhere. All pipe is extra heavy galvanized wrought iron, and all connections extra heavy malleable iron. The system is designed for a pressure of 300 lbs. per sq. in.

HEATING AND VENTILATION.

The entire terminal will be heated by a system of hot water (forced circulation), the plant being situated in the power-house, some 600 ft. distant. Hot water was adopted in preference to steam for two reasons: First, on account of the difficulty of running return pipes in connection with the steam apparatus below the first floor on account of the construction; second, the greater satisfaction from the heating standpoint and the economy in maintenance.

In addition to direct heating by radiation distributed throughout the building, there is a supplementary indirect system. The main ferry concourse is heated by an air system under fan pressure, the fan and heating-room occupying one of the piers between the ferry slips. The heat is distributed through large ducts 10 x 9 ft., having outlets the entire length of the concourse, with register openings in each bay. A branch of this large main duct is taken across above the ceiling of the concourse and supplies air to the inside offices on the west side. The fan equipment consists of four 90-in. centrifugal cone pressure-fans, each capable of discharging 3,000,000 cu. ft. of air per hour when running at 200 r. p. m. Each fan is belt-connected to a 15-HP. Sprague alternating-current motor.

In addition to this air supply the outer offices on the west of the ferry house, together with the main waiting-room and its subsidiary rooms, and the restaurant, kitchen and toilets in the railroad station proper, are ventilated by means of exhaust ducts connecting to three 72-in. and one 90-in. vent fans similar in construction to the pressure fans above mentioned. These fans will be driven by direct-connected Sprague direct-current motors of 5 and 15-HP., respectively. They are run in a horizontal position, the shafts being ver-

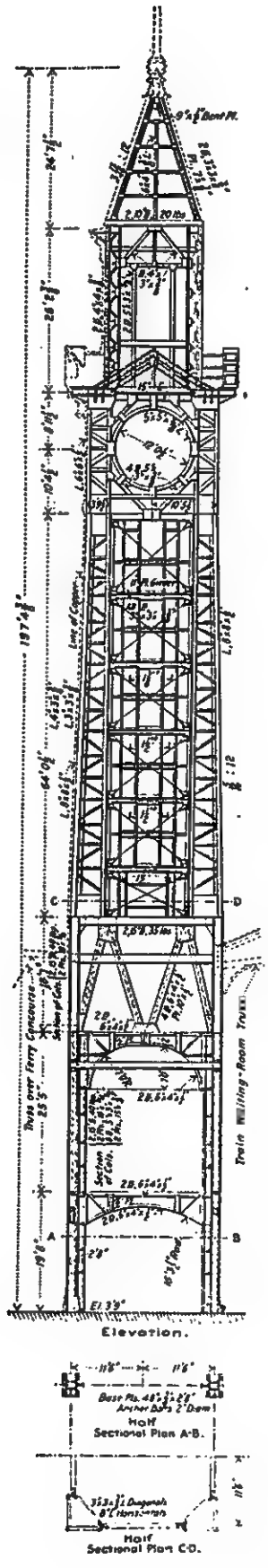


Fig. 9. Framing of Tower (North Elevation).

have already been remarked upon. Another feature worth noting occurs in the floor of the ferry-concourse, where long spans had to be bridged, as the team-concourse beneath could not be impeded by columns. Since head-room in the team-concourse was an important matter, it was necessary to contrive girders of the required span with a minimum depth. This was done by using a pin-connected cantilever construction for the main plate-girder which runs longitudinally under the ferry-concourse floor. Fig. 10 shows the construction used. This girder runs along the middle line of the ferry-concourse. The corresponding girders along the east line of the ferry-concourse, which have equally wide column spacing, do not require this unusual device, as they could be hung from the roof trusses above by a suspender, which halves the girder span (see Fig. 6-b).

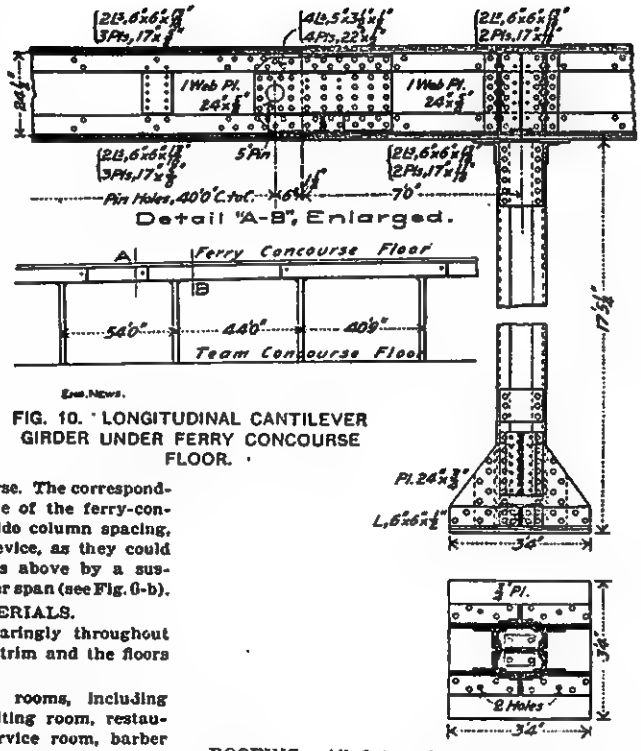


FIG. 10. LONGITUDINAL CANTILEVER GIRDER UNDER FERRY CONCOURSE FLOOR.

FINISHING MATERIALS.

Wood will be used very sparingly throughout the building, being limited to trim and the floors of offices.

FLOORING.—The principal rooms, including main waiting room, ferry waiting room, restaurant, lunch room, kitchen, service room, barber shop and the west bound and main ferry concourses, are floored with terrazzo. In the construction of these floors special attention is given to reducing the danger from cracks to a minimum. The fireproof floor slab finishes 5 ins. from the finished floor. Over this is laid one inch of dry sand, above which is spread a layer of tar paper, and above the paper 2½ ins. of cinder concrete (1:3:6 mix). The top 1½ ins. is a terrazzo wearing surface of cement and Italian marble chips ground and rubbed to a true polished surface. The terrazzo is laid in patterns of various colors determined by the kind of marble used, white and serpentine predominating. These rooms are also provided with marble bases.

The entire area of the inclined concourse is covered with Mason safety treads set in Portland cement. Provision is made for their removal by setting in cast-iron blocks to which the tread is screwed. The team-concourse, comprising almost the entire first floor of the ferry house, is vitrified brick set in asphalt. This paving was adopted after a thorough investigation by the railroad company of granite, wood and asphalt blocks, sheet asphalt, plank and other floors, and was selected because of its great wearing qualities and freedom from slipperiness. The train-concourse floor and some of the storeroom floors are cement. The east-bound waiting-room and the commissary receiving room have asphalt floors of specially selected rock asphalt. The baggage-room has a rock asphalt floor in which is imbedded a cast-iron grill of hexagonal pattern. All asphalt floors are laid under a five-year guarantee. The ferry waiting-room and the piers between the ferry slips are specified of magnesium composition. All office floors are of maple.

ROOFING.—All flat roofs are five-ply tar and gravel, the tar being best straight run American coal-tar pitch. The roofs are guaranteed for ten years by a security company's bond.

DAMP-PROOFING.—To prevent moisture arising from the river and working through the floors, all enclosed rooms of the first floor are protected with a damp-proof course of three-ply felt and coal-tar pitch laid between the fireproof floor slab and the fill. A similar course is provided under the kitchen and toilets of second story and on the inclined plane.

PARTITIONS.—All partitions are constructed of flat metal studding and wire lath. They are of three types: (A) 2-in. solid plaster with one thickness of lath imbedded; (B) 4-in. hollow partition having 2-in. air space, and (C) partitions similar to B but filled solid with cinder concrete. Type B predominates throughout the job. Type C is used where a partition of extra strength is required, as the walls of concourses or where there is a special fire hazard as in the case of store-rooms.

PLASTERING AND FURRING.—All finished rooms are plastered with three coats of patent plaster applied on galvanized metal lath. The furring bars are in all cases bolted to their supports, the only tying allowed being in the attachment of lath. Suspended ceilings are supported on extra strong bolted hangers. In the case of wall furring, bolts are built into the concrete, to which are secured horizontal 1 × ¼-in. bars, 4 ft. c. to c. The ¾-in. channel furring bars, 12 in. c. to c., are bolted to these bars with angle clips and ¼-in. bolts. In the ferry-concourse, the wall furring is divided into separate panels and the joints covered by pilasters, each cast in one piece

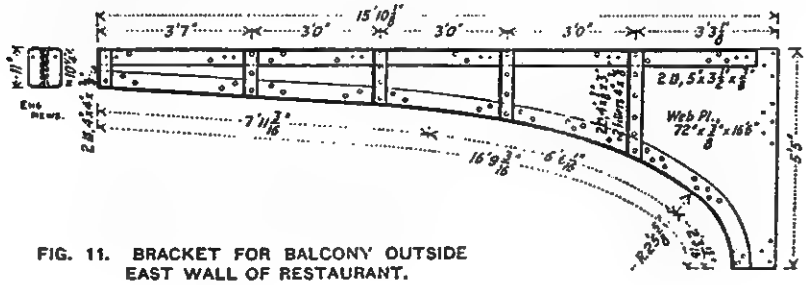


FIG. 11. BRACKET FOR BALCONY OUTSIDE EAST WALL OF RESTAURANT.

tical and supported on a special drop forged ball bearing. The heating of the main waiting-room is controlled by means of the Johnson thermostatic automatic regulation.

ELECTRICAL WORK.

High-tension, 2,200-volt, three-phase, 60-cycle alternating current will be generated at the company's power-house (000-ft. distant) and brought to two high-tension switchboards, where it will be reduced to 230 volts by means of single-phase transformers connected three-phase with half voltage taps, six bus-bars being therefore arranged on the switchboards for the lighting, which will supply three-wire circuits having 230 volts between outers. For the motors, the supply is three-phase three-wire. One switchboard will be located under the inclined concourse and will supply all that part of the building referred to as the railroad station, while the other, located in the ferryhouse, will supply that portion. A motor-generator set is also provided in connection with the railroad station switchboard for supplying direct current at 125 volts for the four ventilating exhaust fans and for the elevators. From the two main switchboards current will be distributed by means of 44 panel boards to the various motors and lights throughout the building.

LIGHTING.—The plans provide for about 6,500 incandescent lamps in the terminal. Of these 1,400 are employed in the five large electric signs; one having letters 0 ft. high, surmounting the river elevation of the ferryhouse, and four with 4-ft. letters on the sides of the tower. These signs are backed with steel plates perforated for the lights. Each light is set in a watertight receptacle which is attached to the plate from the back by a special device and furnished with flexible conductors. The lamps can thus be removed from the back, which will effect large saving in the cost of maintenance of the signs.

The four clock-faces in the tower will be illuminated with incandescent lamps and reflectors, the dials being glass.

About 880 lights will be employed in decorative lighting on the exterior; the arches and imposts of the ferry slips on the east elevation, the pediments of the west elevation of the ferryhouse and the cornice of the north elevation of the railroad station being outlined with lights placed in Federal sign receptacles.

The street front of the terminal and the train concourse is illuminated with twelve-light fixtures placed on the trusses of the marquise and concourse roof from 16 to 33 ft. on centers. The team-concourse on the first floor will be illuminated with 59 arc lamps.

About 3,900 lamps will be employed in interior lighting. Of these, 944 are in the main waiting-room, giving lighting power of 1.68 c. p. per sq. ft. of floor, or .032 c. p. per cu. ft. of space. These are so distributed as to fully illuminate the whole room and also to give ample light for reading on the seats. The ferry concourse on the second floor will have 0.31 c. p. per sq. ft. of floor area and .011 c. p. per cu. ft. of volume. It was not considered necessary to illuminate these concourses as brightly as the waiting-rooms, since they are used merely as passageways between trains, boats and the street.

An emergency gas system is provided for the case of breakdown of the electrical system. A few lights only are placed in each room, the intention being not to fully illuminate the building but merely to provide without delay sufficient light to handle the passenger traffic, and prevent panic and allow necessary business to be carried on.

TELEPHONE AND TELEGRAPH.—Two complete telephone systems will be installed, one for the Commissary Department and one for the Operating Department. These are to be of the intercommunicating type and will connect all the offices and rooms of these respective departments. A complete interior conduit system for public telephone and telegraph is also being installed, so that all of this work can be run concealed.

Each of the more important rooms and the tower will be provided with a clock, there being 28 in all, operated electrically by a master clock [illegible] controlled from the U. S. Observatory in Washington. The tower clock has four faces each 12 ft. in diameter.

PLUMBING.

As the building stands over the water there is no main sewer line, but each soil and waste line empties direct into the river with a flap valve at the outlet to protect the traps from cold. Traps below the first floor were avoided on account of the danger of freezing, but in some cases where traps were necessary the steel beams are set a foot below grade and the space filled up with cinder concrete, in which pipes and traps are placed. Throughout the first floor each fixture discharges individually into the river, and siphonage of traps is prevented by mercury vents, no other venting being necessary. On the second floor each group of fixtures has its own soil and waste lines and stack, and the traps are vented in the usual manner. Except as modified by local conditions as described above, all plumbing work is installed as required by the rules and regulations of the Bureau of Buildings of the City of New York.

The following is the list of principal plumbing fixtures to be installed in the entire terminal:

Water closets	69
Lavatories	68
Urinals	37
Slop sinks	12
Bath tubs	3
Shower baths	5

All lavatories, slop sinks and kitchen sinks are provided with hot water, two Tobey water-heaters being provided for that purpose.

A very copious fresh water supply is provided, since all the ferryboats take water for their boilers while in the slips. The water mains in the ferryhouse are 6-in. and 4-in., and two tanks of 1,200 and 4,000 gals. capacity are provided in the attic space to insure uniform pressure and the quick delivery of a large quantity of water to the boats. Hose bibs are placed at frequent intervals throughout the team and train-concourses for cleaning purposes. The water system for the supply of boats and fixtures is entirely separate from the fire system described above, and is connected with the city mains.

FERRY LANDING BRIDGES.

The main ferry bridges, on the first floor, to which the ferryboat is made fast, are constructed of wood in the usual manner (see Fig. 12). The forward end of each bridge is supported by a pontoon, and is further suspended from the second (transverse) roof-truss of the slip by chains passing around overhead sheaves and operated by windlass on the bridge deck. At the rear end the bridge is hinged to the forward end of a double buffer-platform supported on piles, driven close together. The impact of the ferryboat is taken up by the inertia of these platforms and the resistance of the piles; the platforms are separated from the floor of the building proper by a 6-in. air space covered with a sliding plate.

From the balconies opening from the ferry-concourse passengers pass over bridges to the upper deck of boats. These bridges are for part of their length rigidly hung from the trusses above, but the outer sections are supported from the pontoon bridge below and rise and fall with it [the mean fall of tide between high and low water is 5 ft.]. The supporting device is the invention of the consulting engineer of the work, Mr. E. W. Stern, who has applied for patents. The outer end of the overhead bridge is 24 ft. beyond the point of support on the pontoon bridge, while the length of the suspended span is much less than the length of the pontoon bridges. This necessitates some sort of compensating device to make the rise and fall of the outer ends of the two bridges the same. The movable portion of the upper bridge is in three sections, as will be seen by reference to Fig. 13. The inner section is a simple girder span pin connected at each end. The middle section is a cantilever construction supported on posts, pin-connected at the bottom to a shoe on the pontoon bridge, and at the top to the girder span, which thus acts as a link to hold the cantilever up. The outer section is a so-called apron bridge, pivoted, and balanced to work by hand, and operated by the deck-hand on the boat. Its purpose is that of an ordinary gang-plank. It will be noted that in the operation of this structure the floor of the cantilever span remains practically horizontal and the pin of the apron bridge moves vertically the same height as the pin at the bottom of the post.

It will be noticed that there is a heavy bracket on the back of the post under the girder span, but in no way connected to it, and that the shoe at the bottom of the post is arranged to slide on a track. The object of this is to furnish a safeguard in case of accident due to the boat getting out of control and ramming the pontoon bridge with sufficient force to unseat it from its bearings [this has happened] and drive the bridge back on the ferryhouse floor for a considerable distance. Such an accident would result in a serious disaster if the pin at the foot of the post were immovable, since the upper bridge would crash down on the deck of the ferryboat. With the present device, however, the bracket would engage the girder span and the cantilever span be held up while the shoe slides along the track.

TRAIN SHED.

The train shed was designed by the Chief Engineer of the railway company, and is believed to be of an entirely new type. The defects inherent in the wide-span train shed and its great initial and maintenance cost are well known, and after considering several designs of steel arches of various span and types, it was decided to abandon the wide arch entirely and employ some form of open umbrella shed. As it was the intention to place the tracks in pairs to reduce the number of platforms, an umbrella shed of the usual type would necessitate a wide opening between the sheds, and to avoid this undesirable feature the present shed was designed. The essential features, Fig. 14, are a low roof of glass and concrete supported on steel trusses and a narrow continuous opening with aprons at the side extending as low as the smokestack of an engine, so that all smoke passes directly out of the shed to the outer air. The details of the construction are shown in Fig. 15. Cast-iron columns placed on the center line of each platform support transverse-arched plate girders. The top section of the column above the neck is cast square and the girders are bolted to the columns with through bolts. The bents are 27 ft., c. to c., and the total length of the shed, including the overhang at each end, is 607 ft. Expansion is taken care of by an expansion joint placed at every other column, that is, every 54 ft. Transversely, there are eight spans of arches, and the columns are 43 ft. 4½ ins. on centers, except the end spans which cover only one track, and are, respectively, 30 ft. 4½ ins. and 35 ft. 10½ ins. between centers of columns.

The smoke opening over each track is formed by a pair of light lattice stringers which are wrapped with expanded metal and cased solidly in concrete, the surface being floated smooth. The portion of each main girder where it crosses the opening is also encased in concrete, so that the smoke and gases come in contact with no steel-work. The aprons formed by the casing of the stringer at the side of the smoke opening extend low enough to catch all the smoke from the stacks. They also are carried a short distance above the roof as parapets and form an effectual protection to the platforms from driving rain. Narrow openings are pierced in the aprons every few feet, just under the roof, to allow the escape of any smoke or gas that may find its way under the shed. A continuous ventilator is placed on the central skylight at the highest level of the roof for a similar purpose.

Connecting each two columns longitudinally is a steel member, built up of two channels and a plate in the form of a trough which serves both as a stringer to support the roof and as a rain water conductor. The water passes off through leaders enclosed in the columns and thence into drains under the platforms. The trough is lined with copper. The shed is braced longitudinally by plate-and-angle braces riveted to the steel trough mentioned above and bolted to the columns in similar manner to the main girders. The braces are built with a curved flange to correspond with the lower chord of the main (transverse) girders, and the four members springing away from the

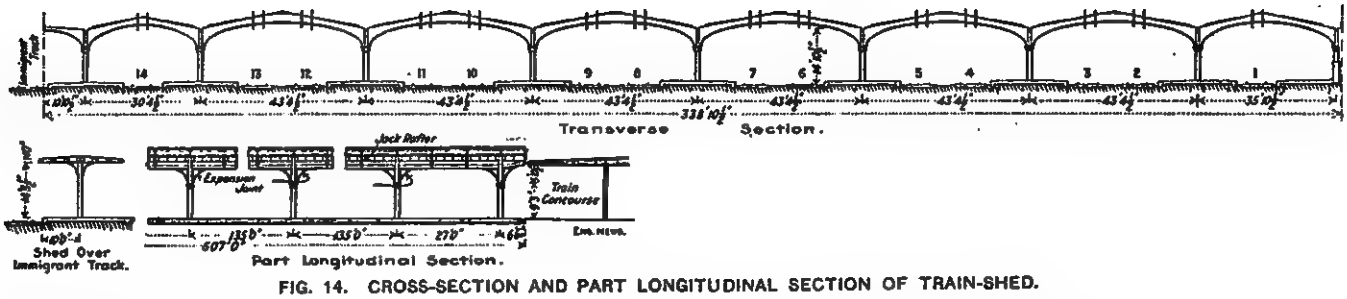


FIG. 14. CROSS-SECTION AND PART LONGITUDINAL SECTION OF TRAIN-SHED.

columns give a very pleasing effect. The columns are fluted and have cast-iron caps under the spring of the arches.

There is a narrow strip of concrete and expanded-metal roof on each side of the gutter, and a similar strip adjacent to the smoke opening. All the rest of the roof is covered with skylight construction supported on deck beams and bulb angles. The skylights are of the "Anti-Pluvius" type.

This shed is now practically completed and portions of it have been completed and in use for several months. As far as can be judged from this limited time, it fully meets the requirements and is giving complete satisfaction.

At its east end the train shed abuts against the glass canopy over the train concourse, a wide platform along the west wall of the train waiting-room. The canopy, whose peculiar supporting trusses are shown in Fig. 16, is part of the terminal station work. The joint between it and the train shed, about 12 ins. wide, is made by a copper gutter, integral with the copper facing of the east gable of the train shed.

The train platforms are reinforced concrete slabs 6 ins. thick and 20 ft. wide, supported on

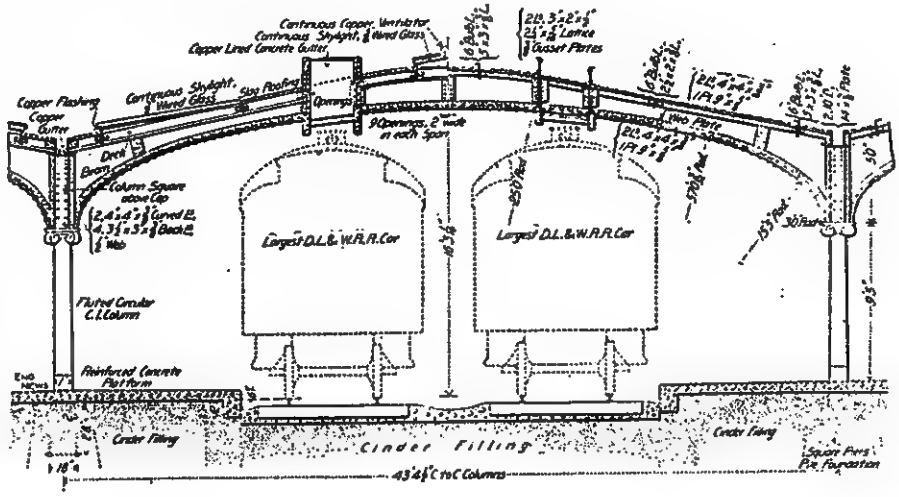


FIG. 15. DETAIL OF ONE SPAN OF TRAIN-SHED.

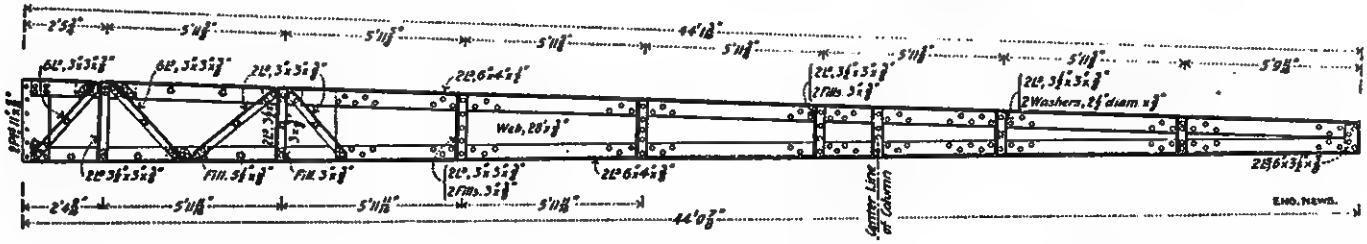


FIG. 16. TRUSS SUPPORTING GLASS CANOPY OVER TRAIN CONCOURSE.

longitudinal reinforced concrete beams at the sides and center. The side beams also form the side of the track pit. The concrete beams are supported on concrete piers 7 ft., c. to c., built on wooden piles which are driven with their tops below the level of the ground water. This construction was adopted on account of the poor character of the ground, which is mainly a cinder fill. The piers carrying the train-shed columns are supported by four piles each. Intermediate piers in the central row and all those for side girders are built over a single pile and were made in the following manner: After the pile had been driven down as far as possible, the head was cut off smooth and an oak follower enclosed loosely in a box or sheath of 2-in. pine plank placed upon it; this follower and sheath is shown in Fig. 17. The sheath was beveled and covered with galvanized iron at its lower end. The follower was somewhat longer than the sheath, and was provided with 2-in. shoulders at its upper end; it was of sufficient length to drive the pile below water level, and the sheath was forced down with it by the shoulders on the follower. When the top of the sheath reached the desired level for the top of the pier, the follower was withdrawn, leaving the sheath permanently in the ground as a form for the concrete. In building the platform slab, the ground was leveled off and the concrete placed directly upon it, but the slab was reinforced to take the entire load without reference to the support afforded by the ground under it. The platforms are finished with cement wearing surface.

A portion of the yards and train-shed extends beyond the bulkhead wall (see Fig. 2), which forms the limit of solid ground. As it was inadvisable to change the bulkhead, piles were driven over the area in question about 3 ft. on centers and cut off at low water level. A solid timber platform was built on these piles and cinders filled in above it up to grade. A concrete retaining wall was built on the platform at its outer edge to retain the fill. Where the train-shed extended over this construction the concrete piers were carried down to the platform. It will be noted that no piles or woodwork are above water level.

Some numerical data, not given in the preceding, which may be of interest in connection with this terminal station, are the following:

Terminal building,	total ground area	138,600	sq. ft.
Main waiting-room,	area	8,640	" "
	seating capacity	140	
Combined areas of ferry waiting-rooms		11,460	" "
	seating capacity	105	
Ferry concourse	area	28,900	" "
	seats	72	
West-bound concourse,	area	5,400	" "
Inclined concourse,	"	2,600	" "
Team concourse,	"	42,000	" "
Train concourse,	"	21,800	" "
Total area of concourses and waiting-rooms		121,000	sq. ft.

The main terminal building is being erected by Snare & Triest, who are general contractors for the entire work. The steelwork was furnished by the Fort Pitt Bridge Works, of Pittsburg, Pa., but is being erected by the general contractors. Besides the general contract, the following

Fig. 17. Pile Follower and Concrete Mold, for Piles of Station Platforms.

special contracts for work on the station may be noted: heating and ventilating, Baldwin Engineering Co.; electrical work, Peet, McAnerney & Powers; plumbing, Gus Staats; clocks, Selfwinding Clock Co.; refrigerating equipment, Brunswick Refrigerating Co.; all of New York, N. Y.

As already noted, the train-shed and the foundations of the railroad and ferry station were designed by the engineering department of the Delaware, Lackawanna & Western R. R. Co., Mr. Lincoln Bush, M. Am. Soc. C. E., Chief Engineer, and erected under the supervision of Mr. Joseph Snell, Superintendent of Docks & Buildings. The plan and architectural design of the railroad station and ferryhouse is the work of Mr. Kenneth M. Murchison, of New York, N. Y., under whose supervision the work was carried out in all its details. Mr. E. W. Stern, of New York, designed the steelwork as Consulting Engineer.

2. In his book, American Ferryboats, John Perry's recollections of a ride on the Hoboken Ferry as a daily commuter offer important insights into the commuting experience which reached its end in 1967.

There was a choice of ferries available in the 1930's: to 23rd Street, Christopher Street, or Barclay Street. Mine was Barclay Street. Each morning, when the sliding doors opened, came a moment of anticipation: What was the river like today? What would we see? I hastened across the bridge and around the deck to the far end, for much could be seen even while the ferry was loading.

The river was always choppy, but at times there was a heavy swell, or there might be whitecaps, and in winter we sometimes saw ice-floes. Dutch and Scandinavian liners were at piers just upstream from the ferry. Almost always we saw a liner or two coming up from the Narrows, sometimes a white-hulled cruise ship from the Caribbean, once a file of warships making for anchorage off Riverside Drive. Herring gulls perched on the greenheart piling and wheeled overhead. The background was the skyline of New York, dominated by the Empire State Building.

The whistle blew, bells jangled in the engine-room, the deck vibrated, and we were off. We exchanged whistle signals with an incoming ferry, again with a tug maneuvering toward the Lackawanna freight docks. Then we were clear, the harbor breeze met us, and we turned south, bringing Ellis Island and the Statue of Liberty into view.

By now the passengers had taken up their customary morning routines. On the upper deck, outside, the physical culturists walked two abreast, around and around, twenty circuits between Hoboken and Barclay Street. The more passive nature-lovers sat on the benches outdoors, on the lee side if the wind was raw, but outdoors even in the coldest weather, gloved and mufflered. The "deep-water" men took up their stance forward, feet planted solidly, inviting the onslaught of the elements; a few extremists of this category chose positions on the lower deck where they might, on some mornings, taste salt spray.

In the main salon on the upper deck was a coffee bar, which in those days served its brew in real china cups. Here the Rising Young Executives gathered to

talk about Big Deals, blocking access to those too timid to shove through them. Meanwhile, Big Deals were actually being made by gray-haired men wearing gray gloves and white scarves, who met by appointment in quiet corners to the rear. The members of Middle Management sat shoulder to shoulder on the rows of benches, as identical as starlings on telephone wires, each behind a copy of the New York *Times* or *Herald-Tribune* folded, New York fashion, vertically down the middle.

The newly hired office boys and clerks roved about uneasily, sometimes clustering in a callow effort to imitate the Rising Young Executives. The dullards were in the cabins below, sitting passively, eyes downcast; some had made the crossing thousands of times without a glance at the river.

Truck-drivers relaxed in their cabs. A handful of early-morning tourists pushed against the rails, staring at the ships, the skyline, and the Statue. Meanwhile Tony—was there ever a shoeshine boy with a name of his own?—made his rounds, pointing accusingly and embarrassingly at every unshined pair of shoes.

The ferries were fast (they could do better than twenty miles per hour) so the crossing was soon made. The captain judged wind and tide, rang for half speed, then for STOP as the ferry dropped into the slip. He crowded against the resilient pilings to lose way, signalled for reverse engines, for STOP again just as she touched, then SLOW AHEAD to hold her while the chains were fastened and the ratchets clanked merrily.

A daily game was played on the upper deck. Two bridges gave access to shore. One deck-hand would open them, each in turn. The challenge to the passengers was to guess which he'd open first, and he had designed any number of strategies to lure the majority to one side while he opened the other.

He was also wise enough to stand aside once the gates were opened, for the front ranks stampeded ashore, some racing to grab taxis, others to beat office time-clocks.

One more pleasure lay ahead for those who had time: we could walk to the subway through Washington Market, where at this very moment the ovens of the Hotloaf Bakery were being opened, and stop for breakfast pastry and coffee. I was, at first, slightly horrified to see other early-morning customers at an adjacent stand eating raw cherrystone clams for breakfast, until I tried it myself one morning and discovered the sweet, briny taste of a really fresh clam, a taste which ice cannot preserve until dinner-time.

Then it was time to board the subway, ride to Grand Central, and walk to my office. Total travel time: one hour and forty minutes, three hours and twenty minutes each working day, sixteen hours and forty minutes each week, eight hundred and thirty-three hours and twenty minutes in a 50-week year.

In the late afternoon, the commuters were subdued going home. They gath-

ered somberly in the Barclay Street ferryhouse, not crowding at the gate, and walked rather than raced aboard when it opened. More of them chose the enclosed lower cabins on this trip, relaxing or sagging on the benches, and no one on the upper deck thought of walking twenty circuits around.

But for me and some fellow-passengers this voyage was a peaceful bridge between work and home. We stood on the upper deck, heads bared to the evening breeze, watching the lights come on, leaving the city to the street-cleaners and charwomen who would prepare it for our return.

By six-thirty the last of the commuters had crossed, save for a few with evening work or theater tickets. Other passengers would cross in the night: late-shift industrial workers, railroad men, and near dawn the drivers of produce trucks. On fair nights there would be others, too, of whom Edna St. Vincent Millay wrote:

"We were very tired, we were very merry—
We had gone back and forth all night on the ferry . . ."

For where else could a young couple living in the city's canyons do their courting? Not in the movies or a smoke-layered cafe. Not in crowded Washington Square, or under the eyes of patrolmen in Central Park.

Where else but the ferry, which was right at the end of the street? Two coins in the box, and a moment later the whistle would blow and the city be left behind. Even with no moon or if the sky were overcast, the city's light cast a gentle radiance. At night the upper deck was quiet, and other passengers would keep a little distance away from a couple's chosen spot. For dreamers here was the stuff of a million dreams: the ships, the sky, the gateways to the open ocean, and on the return trip the panorama of the city, land of opportunity, with a million lights in a million windows, each one a star, a career, a hope.

The ferries were the people's yachts, their cruise ships, and the best of all sailed from Whitehall Street, at the lower end of Manhattan, to St. George on Staten Island. This was a half-hour voyage for a nickel. Until a few years ago, the Elevated trains ran all the way from the Bronx to South Ferry, and on hot summer nights, when the windows of the old wooden cars were open, the downtown trains were crowded with couples and families, off for a twenty-cent excursion to cool the hours between supper and bedtime.

On Sundays, too, they came, to stroll around the Battery, visit the old Aquarium with its diving penguins, and sail across the harbor on the ferry. In the past fifty years these Staten Island boats have steamed twenty million miles, with a billion passengers. Ten boats are in service now, and this crossing to St. George is, as yet, untouched by bridge and tunnel builders.

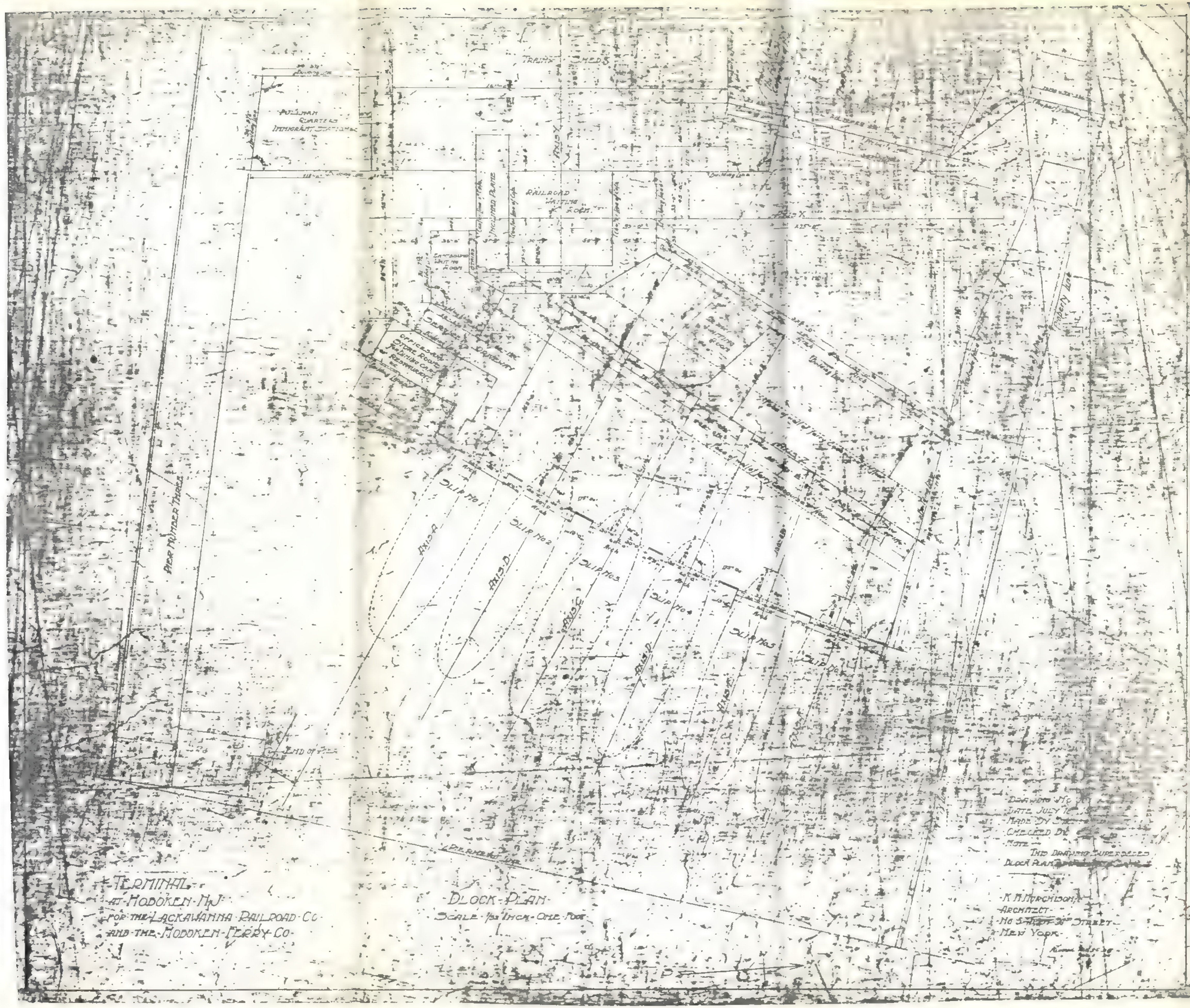
That Staten Island terminal, by the way, obtained its name in an unusual fashion.

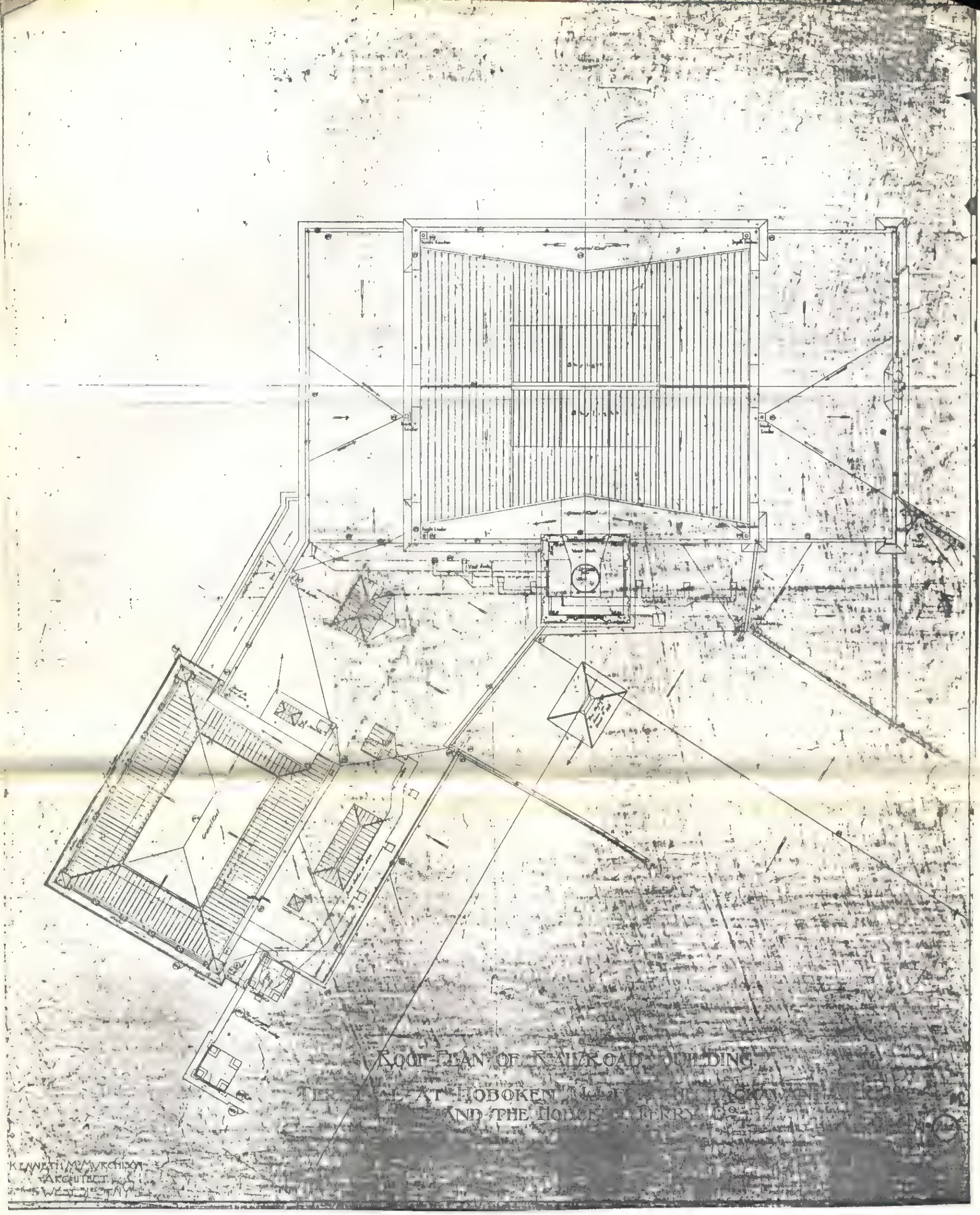
Appendix B. Architectural Drawings

The following are reproductions (transparancies) made of blueprints located in the drawing vault of the vacant REA Buildings on Observer Highway. They represent an important source of original construction information on the buildings designed by Kenneth M. Murchison, c. 1904 to 1906. The drawings appear in the following order:

Sheet #		Date
101	Terminal block plan	1904
107	Roof plan, terminal and ferry buildings	1905
110	South elevation, terminal and ferry buildings	1904
113	Elevation, main waiting room, ceiling plan, west-bound concourse, elevation of north wall of west-bound concourse.	1904
115	Section, ferry landing (looking east), transverse section of ferry slip	1904
116	Plan of ceiling, east elevation of concourse	1904
201	Elevations of roof restaurant	1905
202	Restaurant ceiling plan	1905
207	East-bound waiting room	1904
208	Vestibules,various	1904
211	North elevation of railroad station	1904
212	Plans of kitchens and lunchrooms	1905
219	Plan of marquee	1906
310B	Detail of sign of cupula	1906
302	Transverse section through center of typical pier	1904
303	Interior and exterior details of restaurant	1905
308	Detail of ferry concourse	1904
309	Detail of ferry concourse	1905
310	Details of fixtures in commissary department	1905
311	Deatil of stair and elevator, east-bound waiting room	1905
313	Details of concourse fence, detail of entry to inclined concourse	1905
314	Details of construction of walls of inclined concourse and pier No. 1	1905
319	Details of north exit from terminal concourse	1905
322	North elevation of baggage room	1905

Architectural Drawings
Series 100

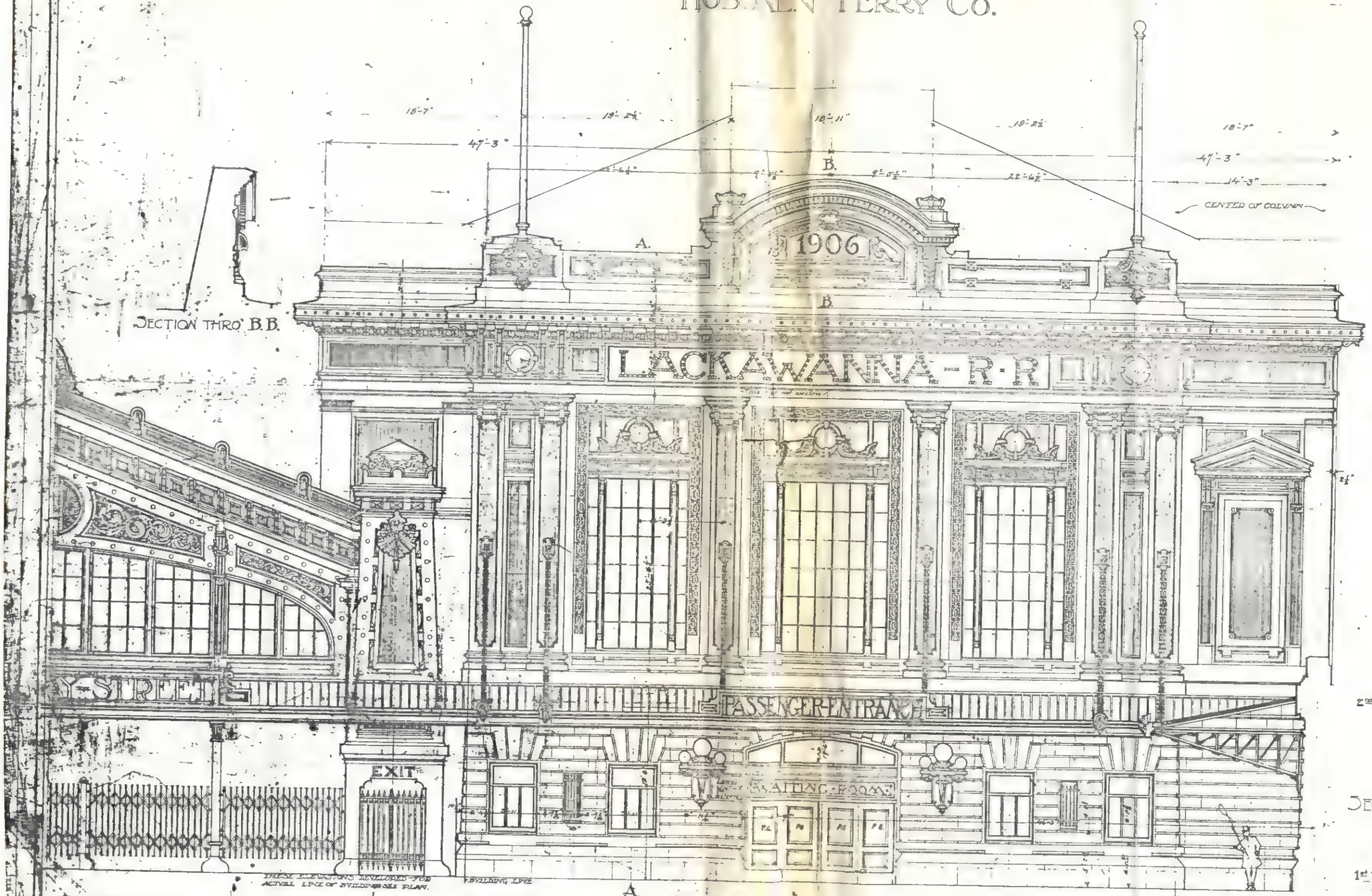

TRAIN SHEDS
PULLMAN QUARTERS IMMIGRANT STATION
RAILROAD WAITING ROOM
PIER NUMBER THREE
SLIP NO 1
SLIP NO 2
SLIP NO 3
SLIP NO 4
SLIP NO 5
TERMINAL
AT HOBOKEN N.J.
FOR THE LACKAWANNA RAILROAD CO.
AND THE HOBOKEN FERRY CO.
BLOCK PLAN
SCALE 1/32 INCH = ONE FOOT
K M MURCHISON
ARCHITECT
NO 5 WEST 31ST STREET
NEW YORK


ROOF PLAN OF RAILROAD BUILDING
AT HOBOKEN
AND THE HOBOKEN FERRY CO.
KENNETH McMURCHISON
ARCHITECT

SOUTH ELEVATION

TERMINAL AT HOBOKEN N.J. FOR THE LACKAWANNA R.R. Co

TERMINAL AT HOBOKEN N.J. FOR THE LACKAWANNA RAILROAD CO. AND THE HOBOKEN FERRY CO.



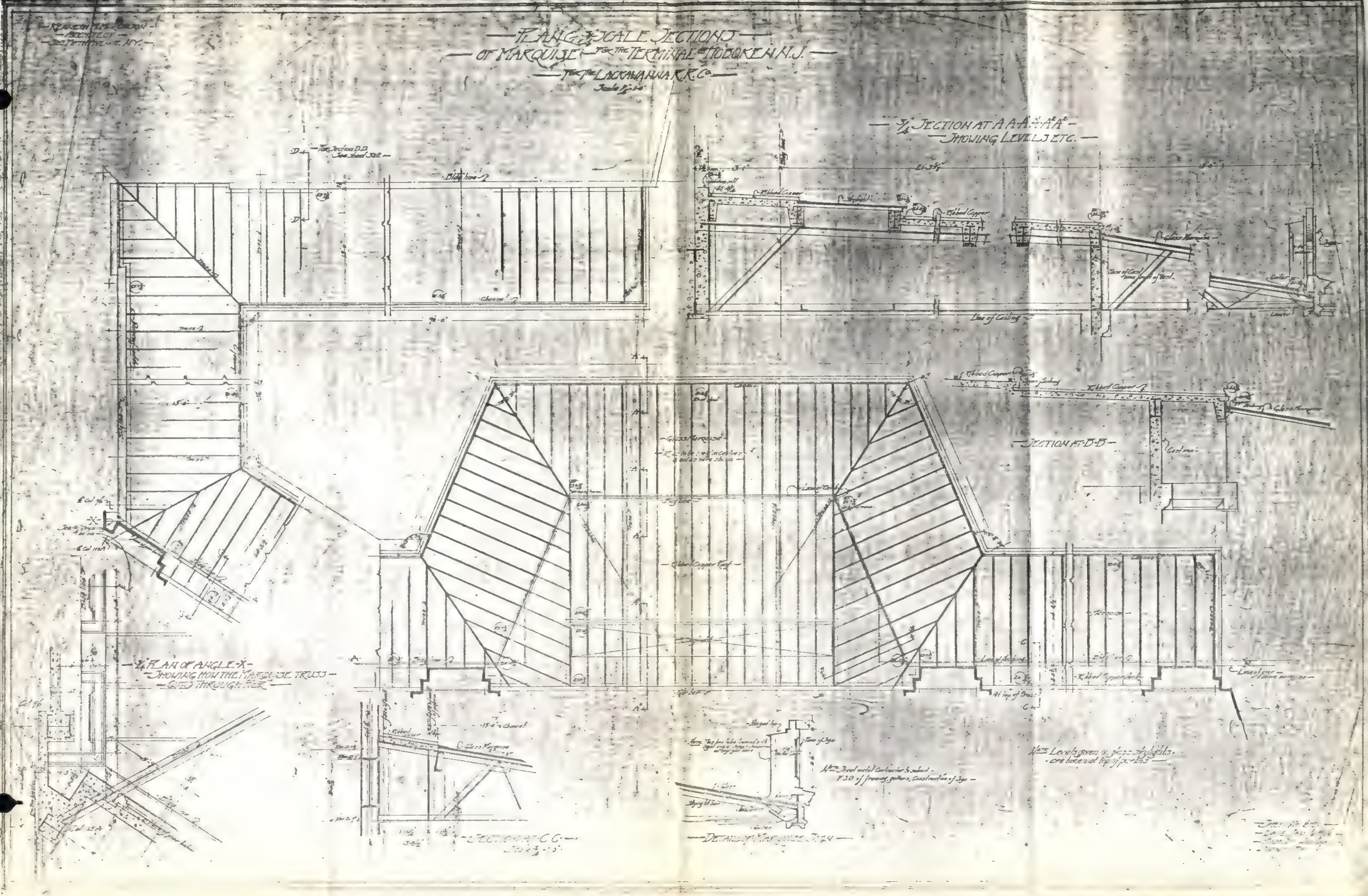
ONE-HALF OF ARCH IN FERRY HOUSE.
KENNETH M. MURCHISON, ARCHT.
5 WEST 31st ST. NY

A
NORTH ELEVATION of RAILROAD STATION.

SHEET No. 21

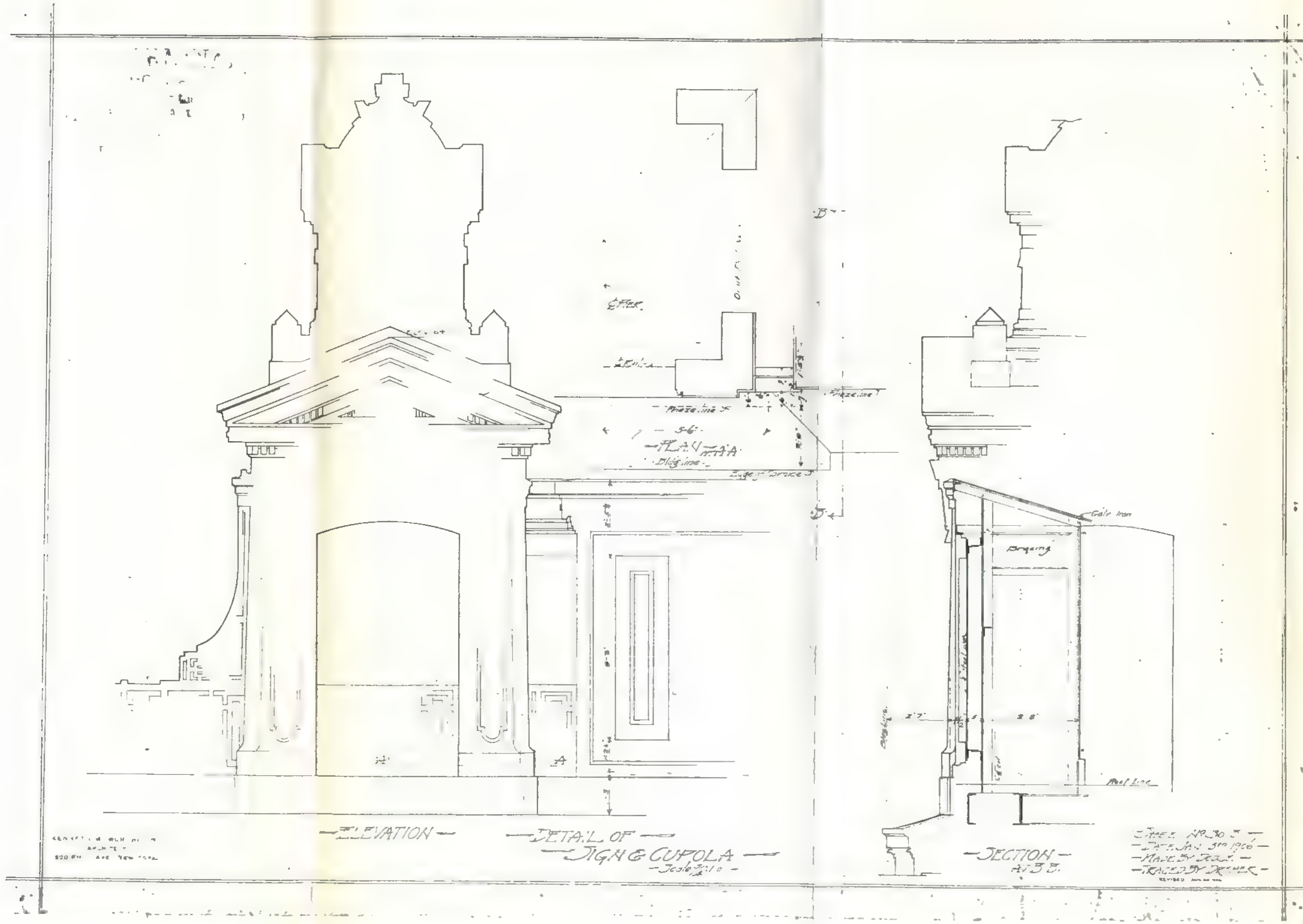
SCALE ¼" - 1'-0"
Date, Nov 3 04
Made by, Dodge.
Checked by, [illegible]

-Plan-
-Detail of Pantry Cupboards-A-
-LUNCH-ROOM-
-Detail of Dresser & Kitchen & Pantry-
-Dresser in Dub Pantry-
-SEWING ROOM-



— Plans & ¾ Scale Sections —
— of Marquise for the Terminal at Hoboken N.J. —
— for the Lackawanna R.R. Co. —
¾ Section at A-A-A-A-A —
— Showing Levels etc. —
Section at D-D
¾ Plan of Angle-X
— Showing how the Marquise Truss Goes Through Pier
Section at C-C
Detail of Marquise Sign
Note — Levels given on glass skylights are taken at top of purlins
Glass Marquise
Line of Ceiling
Ribbed Copper

Architectural Drawings
Series 300


ELEVATION
DETAIL OF
SIGN & CUPOLA
SECTION
AT B B.
Sheet No. 30
Date Jan 3rd 1906
Made by
Traced by
Roof Line
Gale Iron
Bracing
Frieze line
PLAN AT A A

DETAIL OF PIER № 1
& HALF OF ARCH

SECTION ON LINE 'C'

SECTION OF PIER AT A

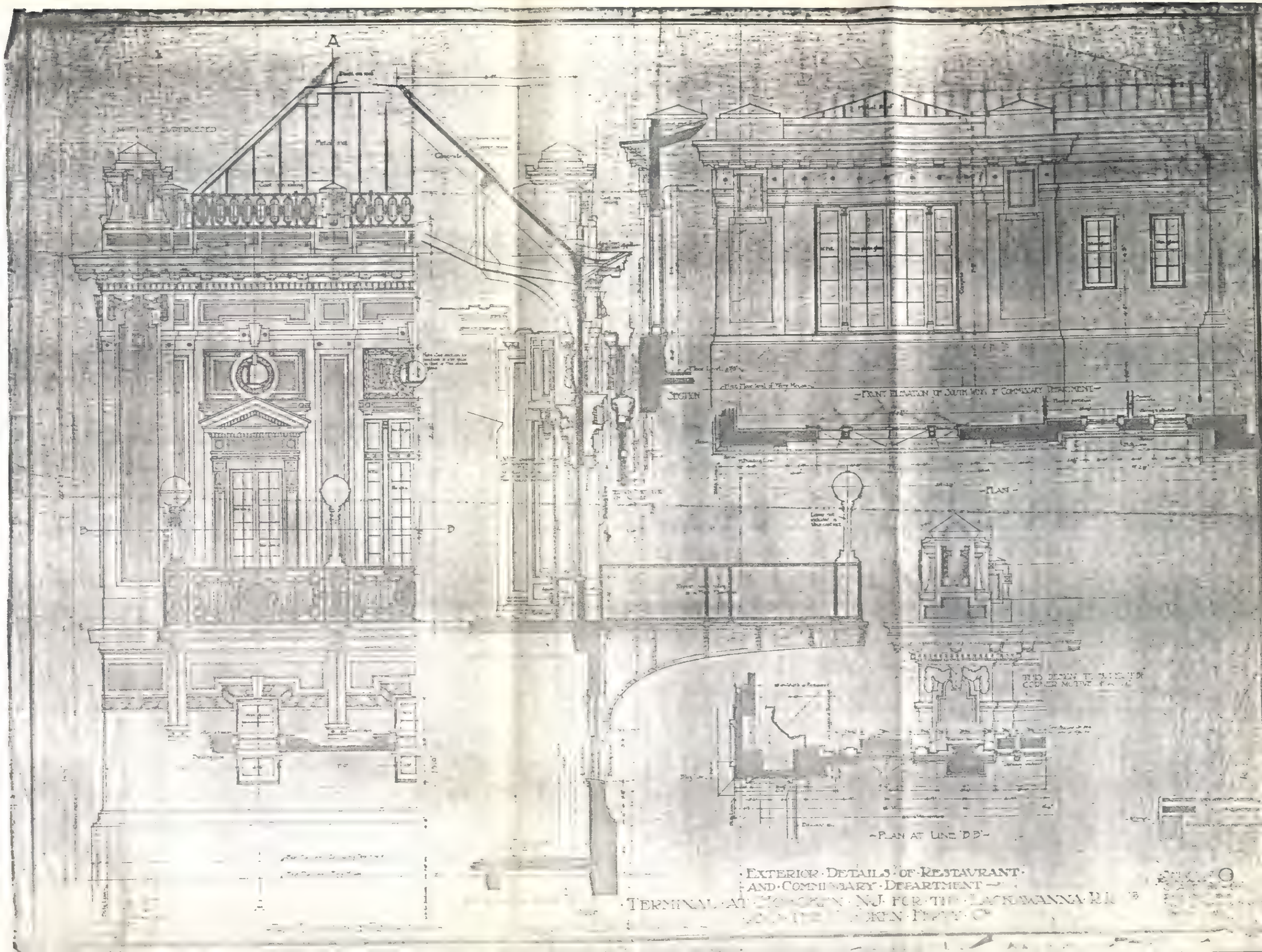
PART PLAN OF PIER AT B

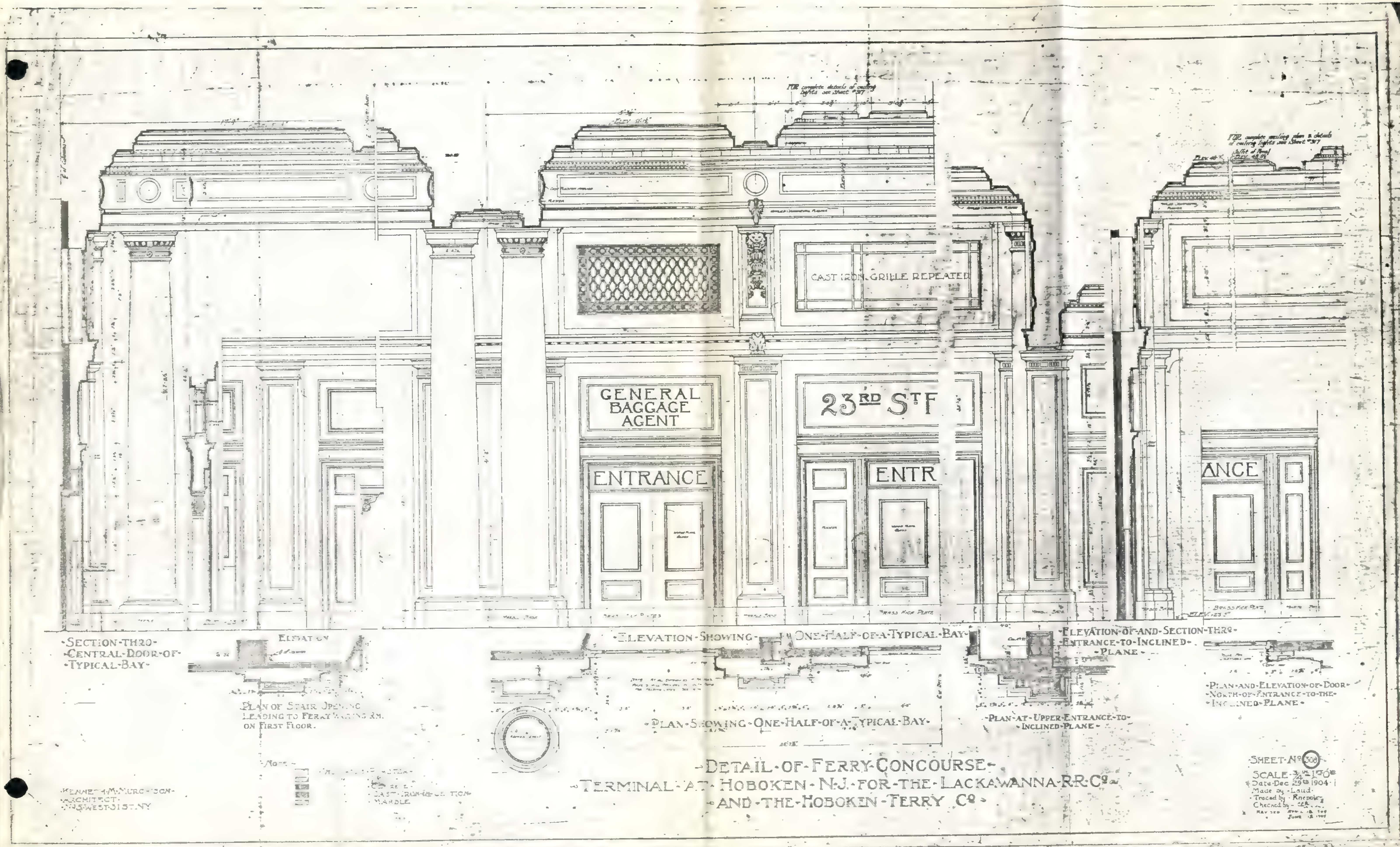
SECTION THRO CENTRE OF ARCH

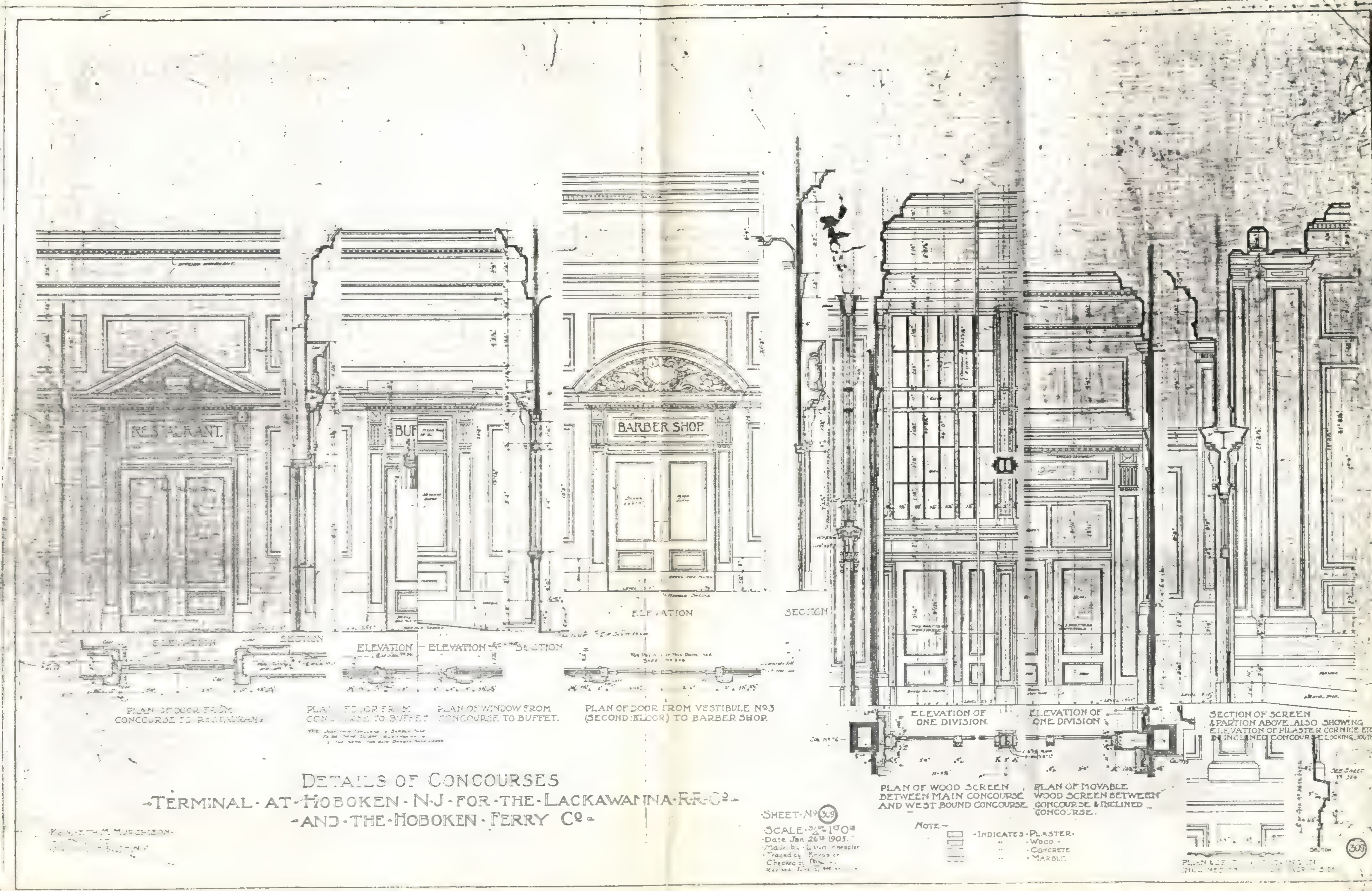
DETAIL OF EAST ELEVATION OF FERRY HOUSE AT HOBOKEN N.J. TERMINAL FOR THE LACKAWANNA R.R.C° & THE HOBOKEN FERRY C°.

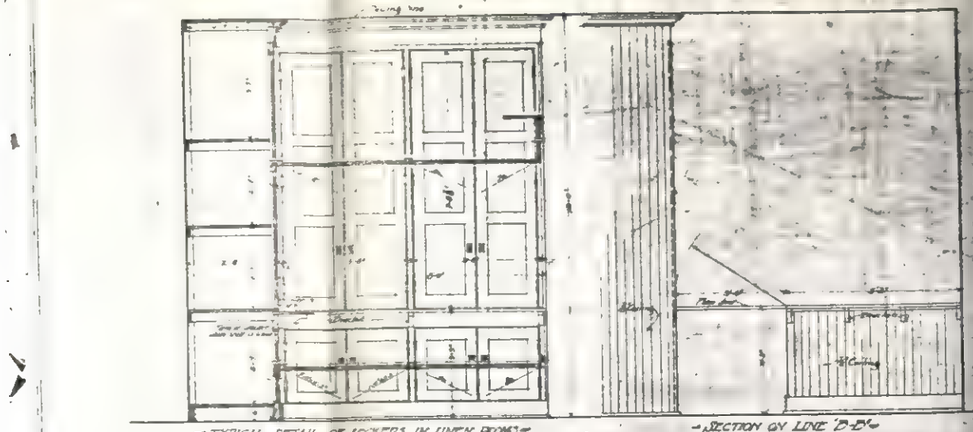
TRANSVERSE SECTION THRO CENTRE OF TYPICAL PIER

SEE DETAILS NOT COMPLETELY SHOWN OR FIGURED ARE AS SHOWN ON SHEET № 301


A
D
D
SECTION
-FRONT ELEVATION OF SOUTH WING OF COMMISSARY DEPARTMENT-
-PLAN-
-PLAN AT LINE 'D D'-
EXTERIOR DETAILS OF RESTAURANT
AND COMMISSARY DEPARTMENT
TERMINAL AT HOBOKEN, N.J. FOR THE LACKAWANNA R.R.
HOBOKEN TERMINAL CO.


CAST IRON GRILLE REPEATED
GENERAL BAGGAGE AGENT
23RD ST F
ENTRANCE
ENTR
ANCE
-SECTION-THRO-
-CENTRAL-DOOR-OF-
-TYPICAL-BAY-
-ELEVATION-SHOWING-ONE-HALF-OF-A-TYPICAL-BAY-
-ELEVATION-OF-AND-SECTION-THRO-
-ENTRANCE-TO-INCLINED-
-PLANE-
-PLAN-AND-ELEVATION-OF-DOOR-
-NORTH-OF-ENTRANCE-TO-THE-
-INCLINED-PLANE-
PLAN OF STAIR OPENING
LEADING TO FERRY WAITING RM.
ON FIRST FLOOR.
-PLAN-SHOWING-ONE-HALF-OF-A-TYPICAL-BAY-
-PLAN-AT-UPPER-ENTRANCE-TO-
-INCLINED-PLANE-
-DETAIL-OF-FERRY-CONCOURSE-
-TERMINAL-AT-HOBOKEN-N.J.-FOR-THE-LACKAWANNA-R.R.Co
-AND-THE-HOBOKEN-FERRY-Co-
KENNETH-M-MURCHISON-
-ARCHITECT-
SHEET No 308
Date Dec 29th 1904
Made by Laud
Traced by Knepole

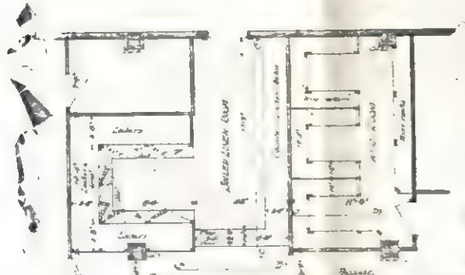

RESTAURANT
ELEVATION
SECTION
PLAN OF DOOR FROM CONCOURSE TO RESTAURANT
ELEVATION
ELEVATION
SECTION
PLAN OF WINDOW FROM CONCOURSE TO BUFFET.
BARBER SHOP
ELEVATION
SECTION
PLAN OF DOOR FROM VESTIBULE No. 3 (SECOND FLOOR) TO BARBER SHOP.
ELEVATION OF ONE DIVISION.
ELEVATION OF ONE DIVISION
SECTION OF SCREEN & PARTION ABOVE, ALSO SHOWING ELEVATION OF PLASTER CORNICE ETC. IN INCLINED CONCOURSE LOOKING SOUTH
PLAN OF WOOD SCREEN BETWEEN MAIN CONCOURSE AND WEST BOUND CONCOURSE
PLAN OF MOVABLE WOOD SCREEN BETWEEN CONCOURSE & INCLINED CONCOURSE.
DETAILS OF CONCOURSES
TERMINAL AT HOBOKEN N.J. FOR THE LACKAWANNA R.R. Co.
AND THE HOBOKEN FERRY Co.
SHEET No. 309
SCALE 3/4 in = 1 ft 0 in
Date Jan 26th 1905.
NOTE –
INDICATES PLASTER
WOOD
CONCRETE
MARBLE
309

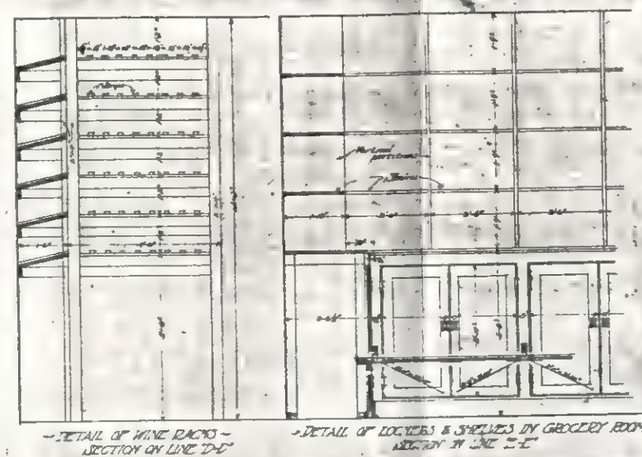


– TYPICAL DETAIL OF LOCKERS IN LINEN ROOMS –
SECTION ON LINE 'A-A'
FOR VARIOUS SIZES SEE PLAN BELOW.

– SECTION ON LINE 'B-B' –

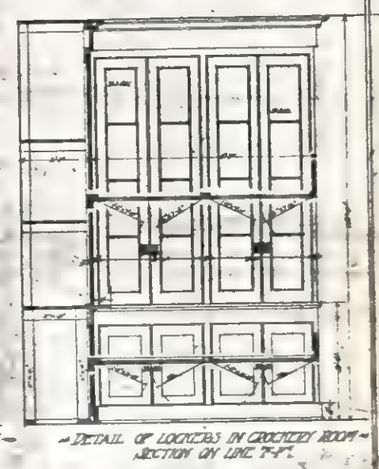
– SECTION ON LINE 'C-C' –



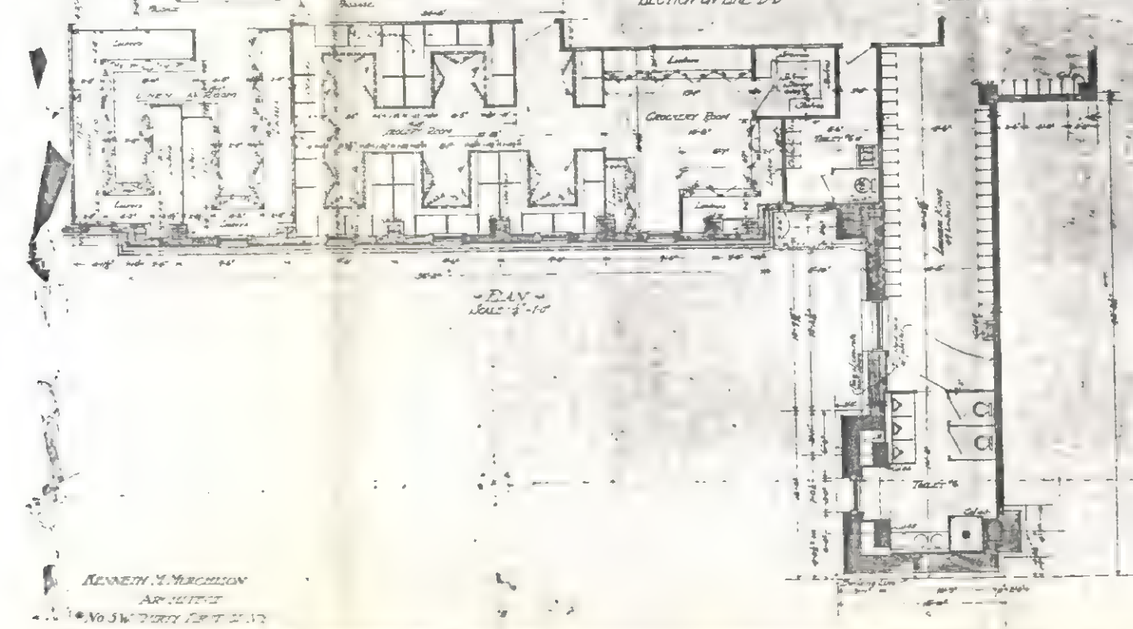


– DETAIL OF WINE RACKS –
SECTION ON LINE 'D-D'

– DETAIL OF LOCKERS & SHELVES IN GROCERY ROOM –
SECTION ON LINE 'E-E'



– DETAIL OF LOCKERS IN GROCERY ROOM –
SECTION ON LINE 'F-F'



– PLAN –
SCALE 1/4"-1'-0"

DETAILS OF FIXTURES IN COMMISSARY DEPARTMENT
– TERMINAL AT HOBOKEN, N.J. –
FOR THE
LACKAWANNA RAILROAD CO.
AND THE
HOBOKEN FERRY CO.

KENNETH M. MURCHISON
ARCHITECT
No 5 W. 31ST ST. N.Y.

SHEET No. 3/0
SCALE 1/4" = 1'-0"
DATE FEB. 25, 1905
MADE BY W.L.P.
CHECKED BY

DETAIL-OF-STAIR-AND-ELEVATOR
-IN-THE-
-EAST-BOUND-WAITING-ROOM-

TERMINAL
AT HOBOKEN, N. J.
for the
LACKAWANNA RAILROAD CO.
and the
HOBOKEN FERRY CO.

SHEET No. 311 SCALE 3/4"-1'-0"
DATE MARCH 15, 1907
MADE BY C.A.K.
TRACED BY C.A.K.
CHECKED BY [illegible]

NOTE: (MAY 2, 08) FOR REVISED DETAILS OF CEILING & WALL TREATMENT OF EAST-BOUND WAITING ROOM SEE P.S.D. SHEETS 325, 326 & 327.

KEY.
INDICATES SLATE
" WOOD
" STRUCTURAL IRON
" CAST OR ORNAMENTAL IRON
" CONCRETE
" PLASTER

KENNETH M. MURCHISON,
ARCHITECT,
5 WEST 31ST ST., NEW YORK.

ELEVATION OF ELEVATOR

ELEVATION - OF - STAIRWAY - TO - CONCOURSE.

SECTION THRO A——B

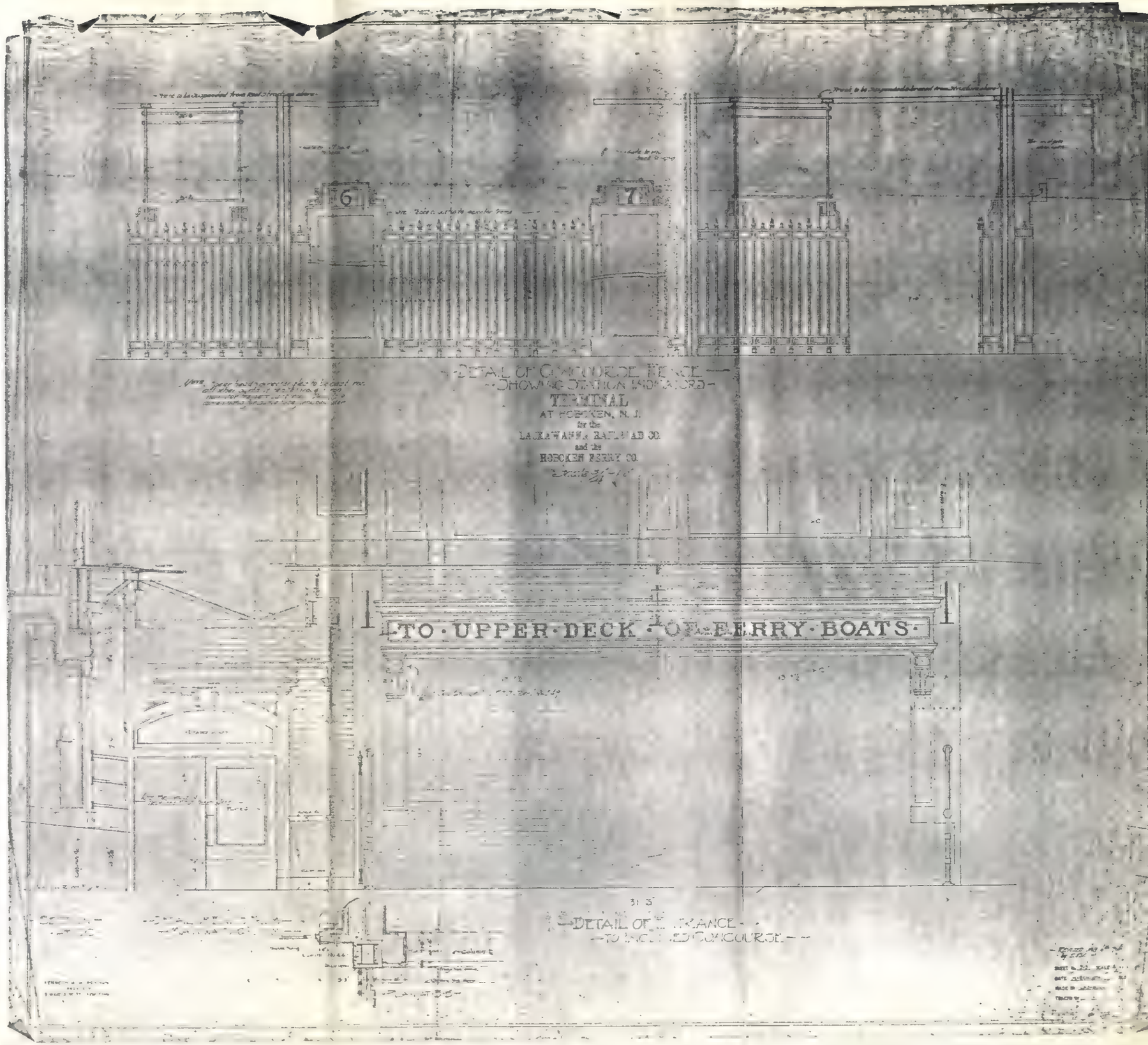
PLAN-OF-ELEVATOR

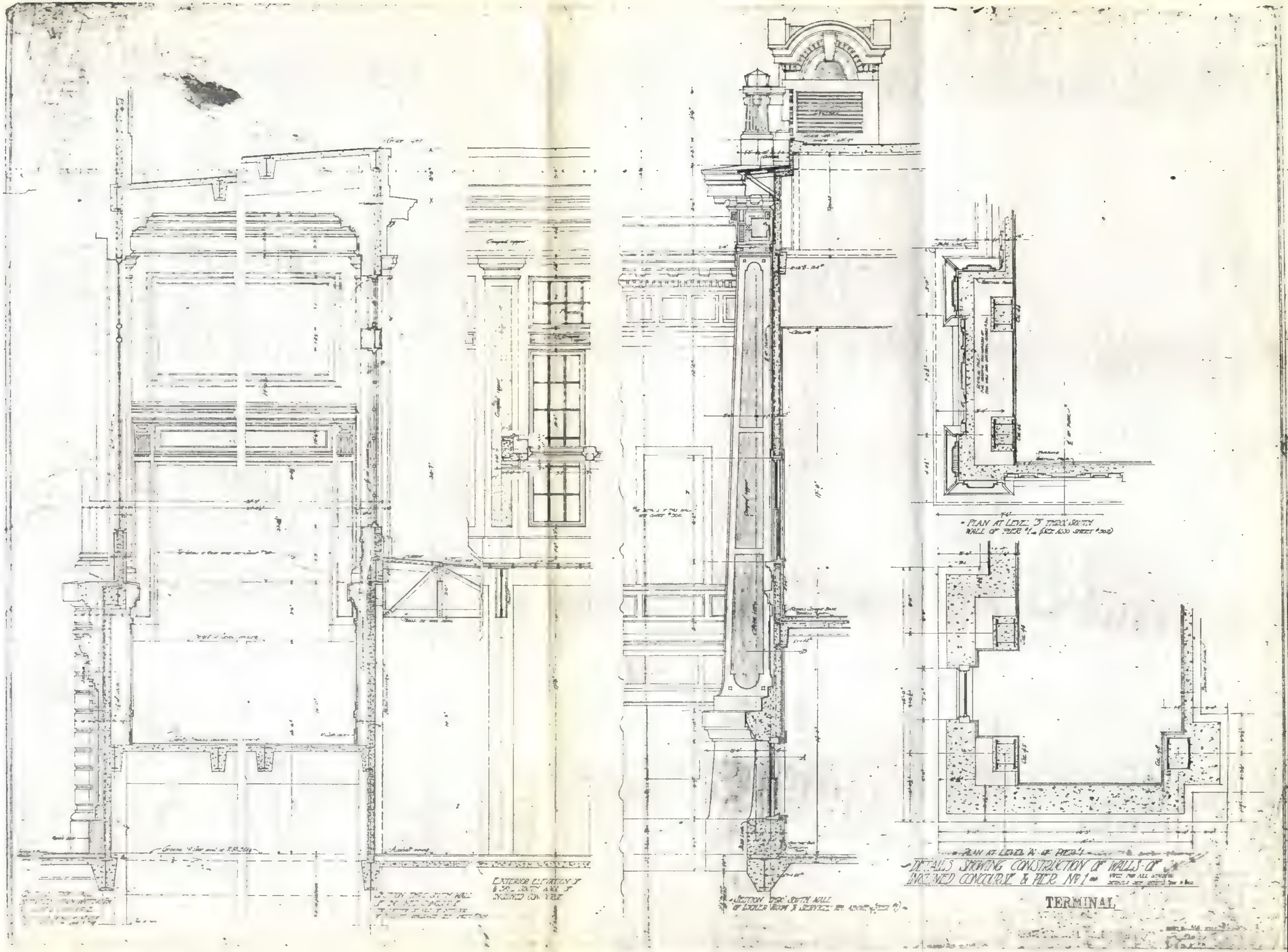
PLAN-OF-STAIR

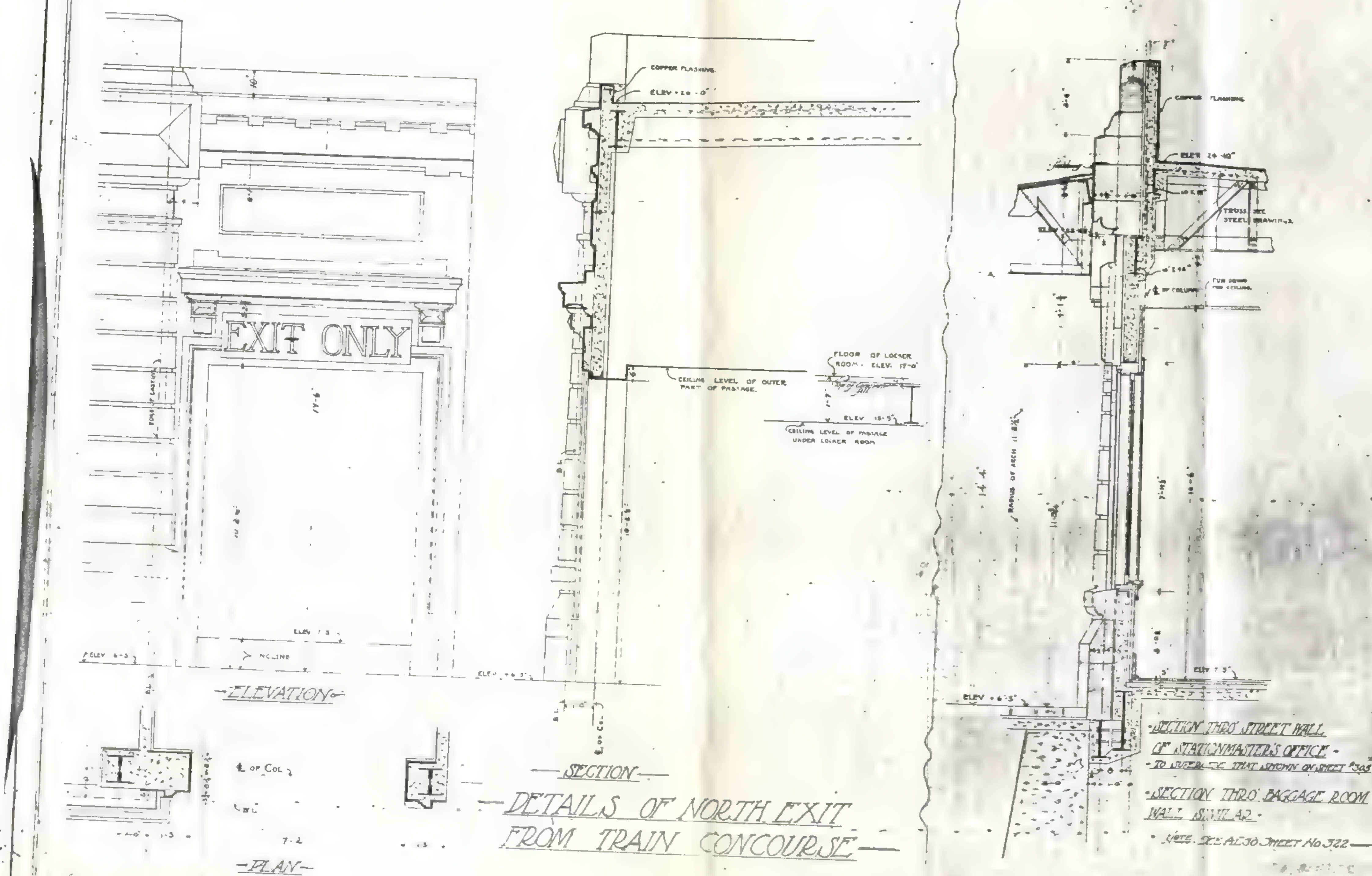
SECTION THRO LANDING.
SCALE 1½"-1'-0"

NOTE.
DETAIL FOR THIS RAIL TO BE USED FOR STAIRS IN GENERAL UNLESS OTHERWISE SHOWN OR SPECIFIED.

DRAWING No. 311


6
7
DETAIL OF CONCOURSE FENCE
SHOWING STATION NUMBERS
TERMINAL
AT HOBOKEN, N. J.
for the
LACKAWANNA RAILROAD CO.
and the
HOBOKEN FERRY CO.
TO UPPER DECK OF FERRY BOATS
DETAIL OF ENTRANCE
TO INCLINED CONCOURSE


PLAN AT LEVEL "A" OF PIER 1
DETAILS SHOWING CONSTRUCTION OF WALLS OF INCLINED CONCOURSE & PIER No 1
TERMINAL


EXIT ONLY
COPPER FLASHING
ELEV. 20-0"
CEILING LEVEL OF OUTER PART OF PASSAGE
FLOOR OF LOCKER ROOM - ELEV. 17-0"
ELEV. 15-5"
CEILING LEVEL OF PASSAGE UNDER LOCKER ROOM
-ELEVATION-
-SECTION-
-PLAN-
DETAILS OF NORTH EXIT FROM TRAIN CONCOURSE
COPPER FLASHING
TRUSS - SEE STEEL DRAWINGS
RADIUS OF ARCH
SECTION THRO' STREET WALL OF STATIONMASTER'S OFFICE -
- TO SUPERSEDE THAT SHOWN ON SHEET #305 -
SECTION THRO' BAGGAGE ROOM WALL SIMILAR -
NOTE. SEE ALSO SHEET No 322

TERMINAL

N. J.

319

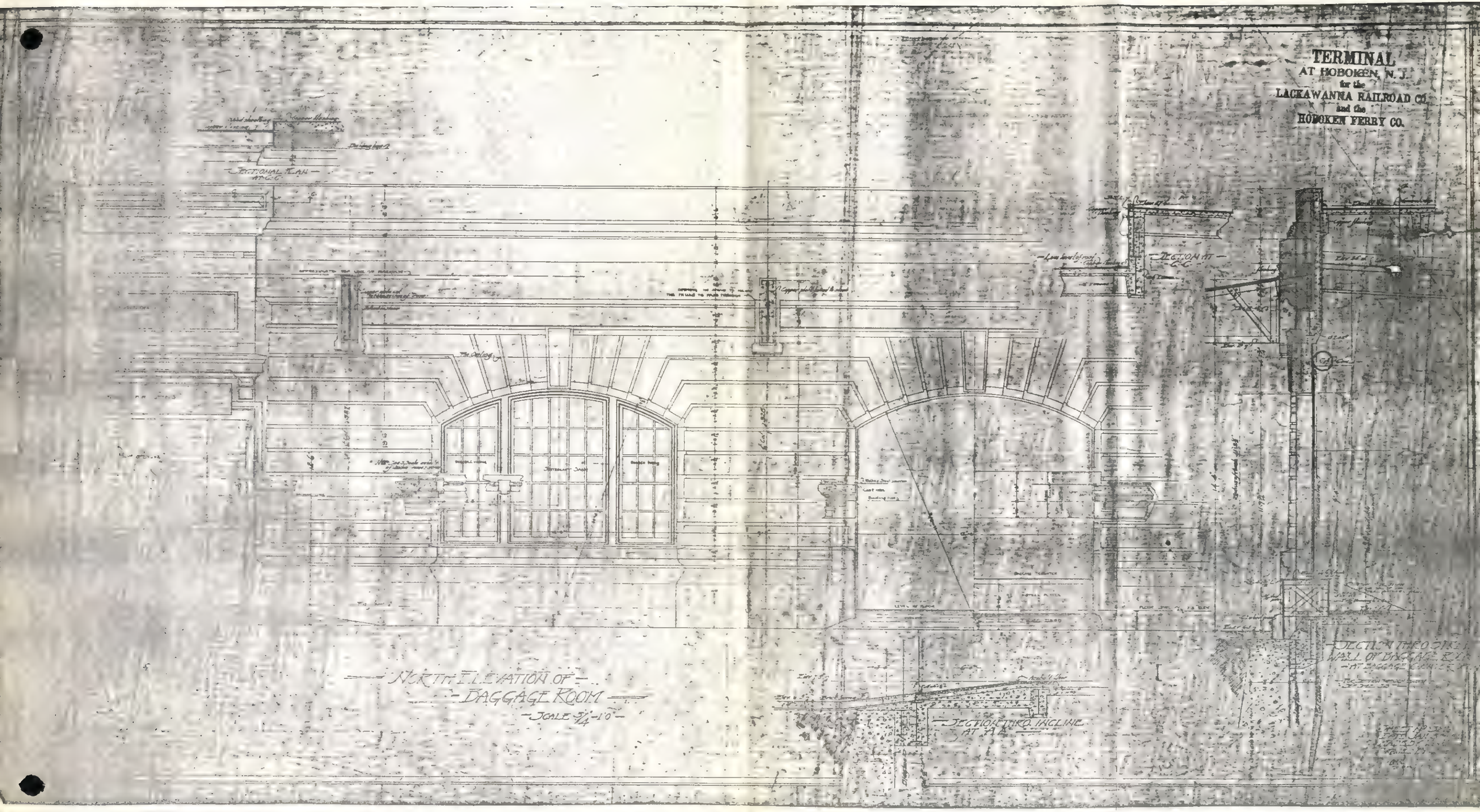
3/4

Oct 20

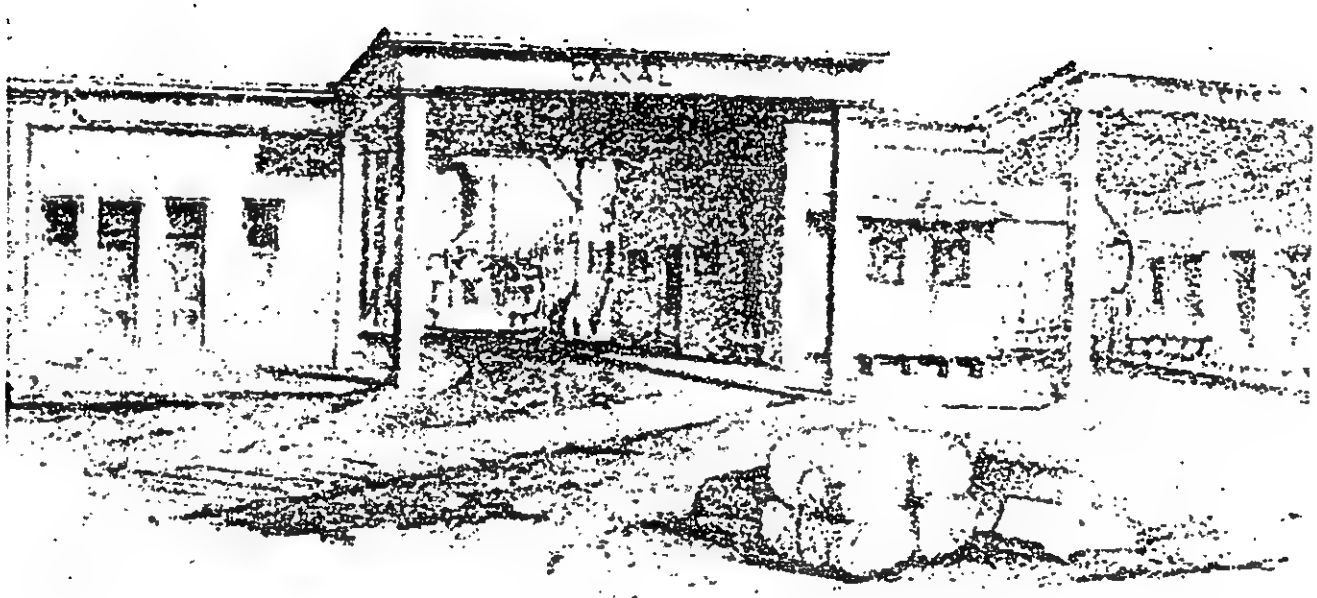
Brown.

Drawer

TERMINAL
AT HOBOKEN, N. J.
for the
LACKAWANNA RAILROAD CO.
and the
HOBOKEN FERRY CO.



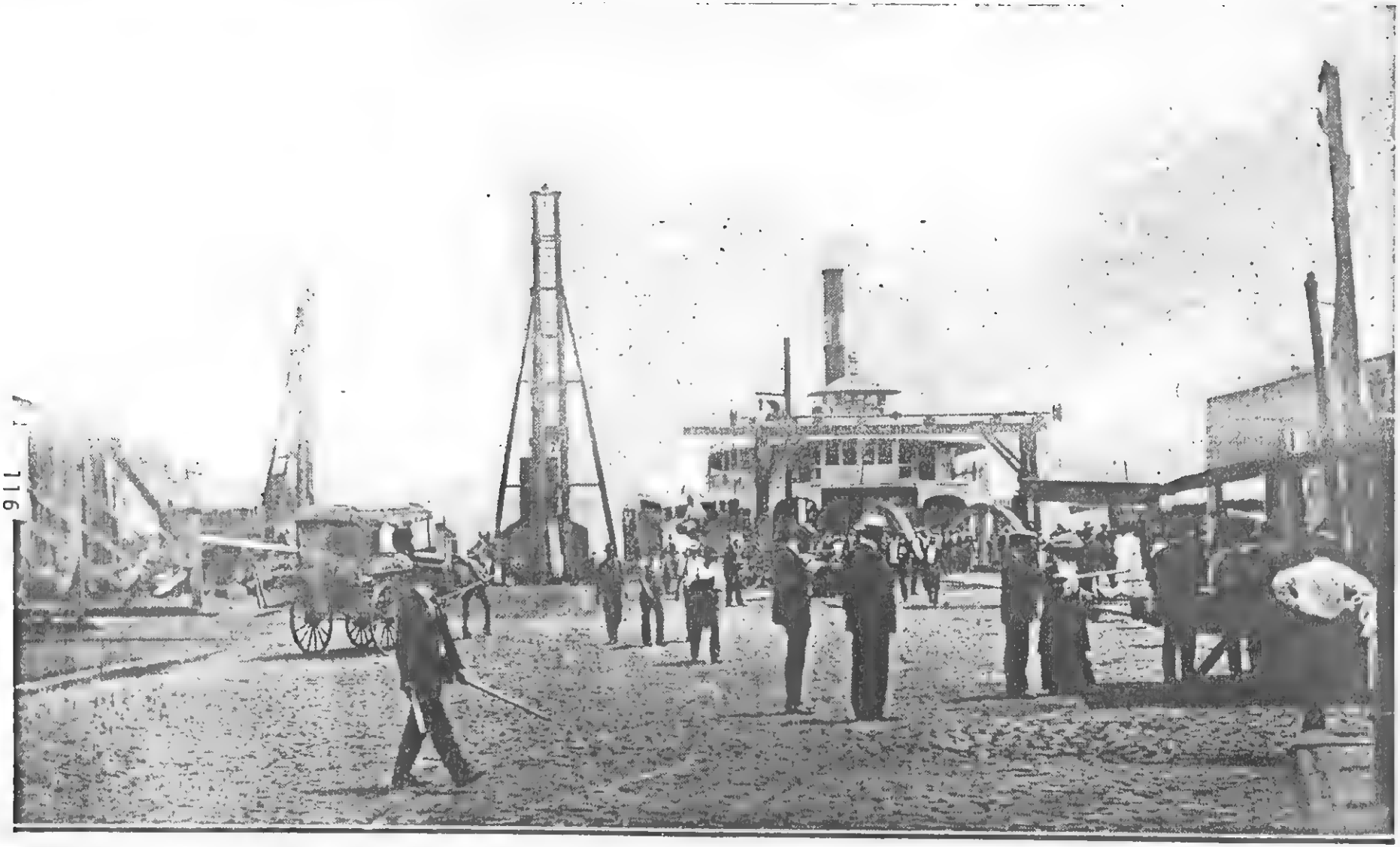
Appendix C. Photographs



Hoboken ferryhouse sketch of 1850, showing the Canal and Barclay St. entrances (from Romance of the Hoboken Ferry).

View looking southeast toward Stick Style ferryhouse at Hudson Place, built in 1896. Its design is attributed to New York architect H. Edwards Ficken. Vehicular access lanes running from the slips to Newark St. are visible in the foreground. (Hoboken Free Public Library, Elysian Camera Club Collection)

Trollies circle near site of Aug. 5, 1905 fire which destroyed Hoboken terminal, and cleared the way for the present terminal. (Photo by W.J. Barry, collection fof Syracuse University, courtesy of John Willever)



ENTRANCE TO HOBOKEN FERRY AFTER FIRE, 8-7-'05.

The ferryboat Elmira (built in 1905) in slip at the site of the Hoboken Terminal. Some of the apparatus of the slips of the former terminal--the rolling logs and ramps--are thought to have been reused in the 1907 building. Postcard view, courtesy, Hudson City Historical Society, Theodore Conrad Collection.

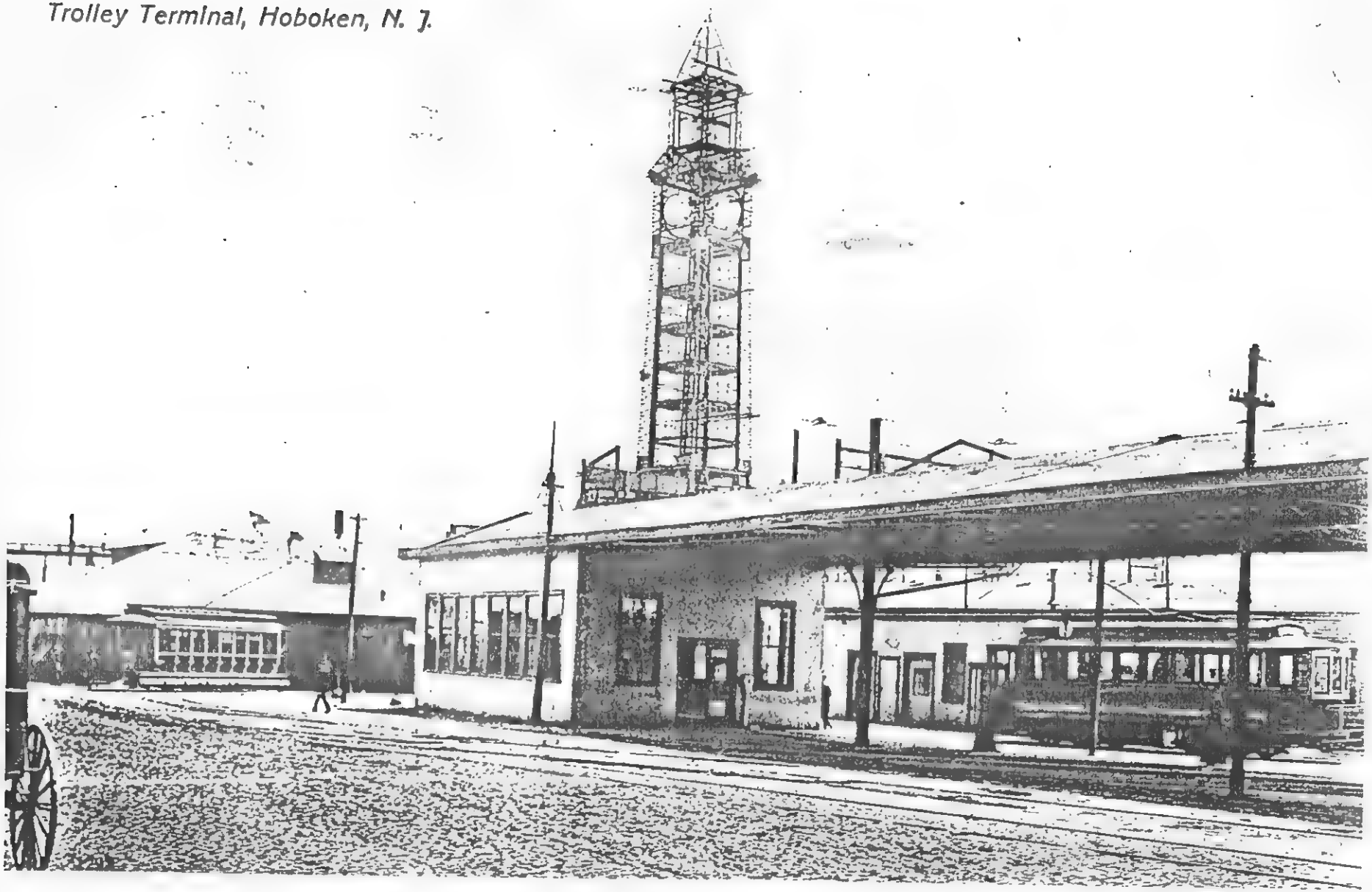
RUINS OF HOBOKEN FERRY FIRE 8-7-'05.

Temporary shelter for ferry company being constructed on ferry plaza immediately after the fire of August, 1905. Enlarged post-card view, courtesy Hudson City Historical Society, Theodore Conrad Collection.

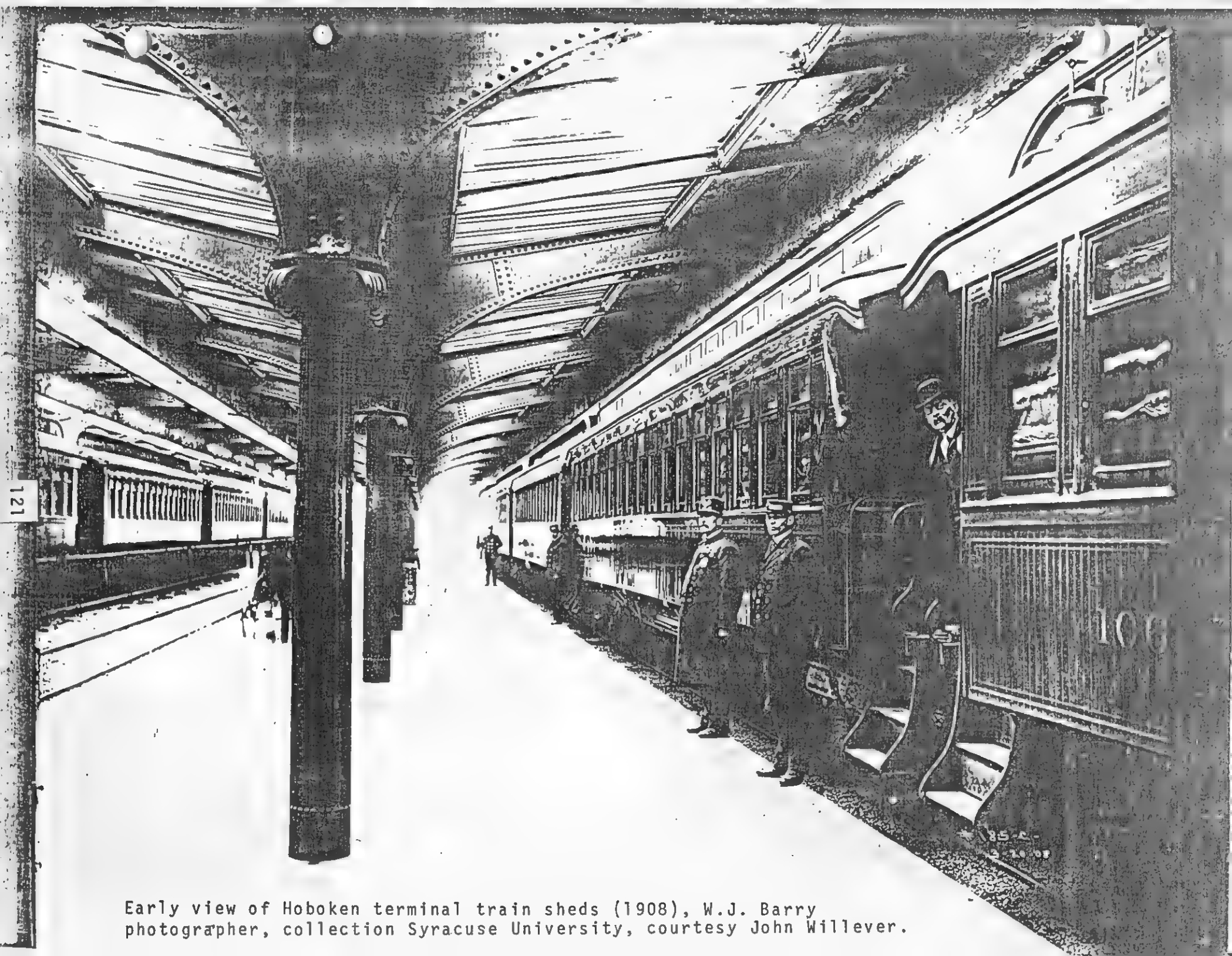
DUKE'S HOUSE AFTER HOBOKEN FERRY FIRE 8-7-'05.

Enlarged postcard view of the restaurant Duke's House on Hudson Place, in ruins after the fire that destroyed the stick style terminal. Courtesy, Hudson City Historical Society, Theodore Conrad Collection.

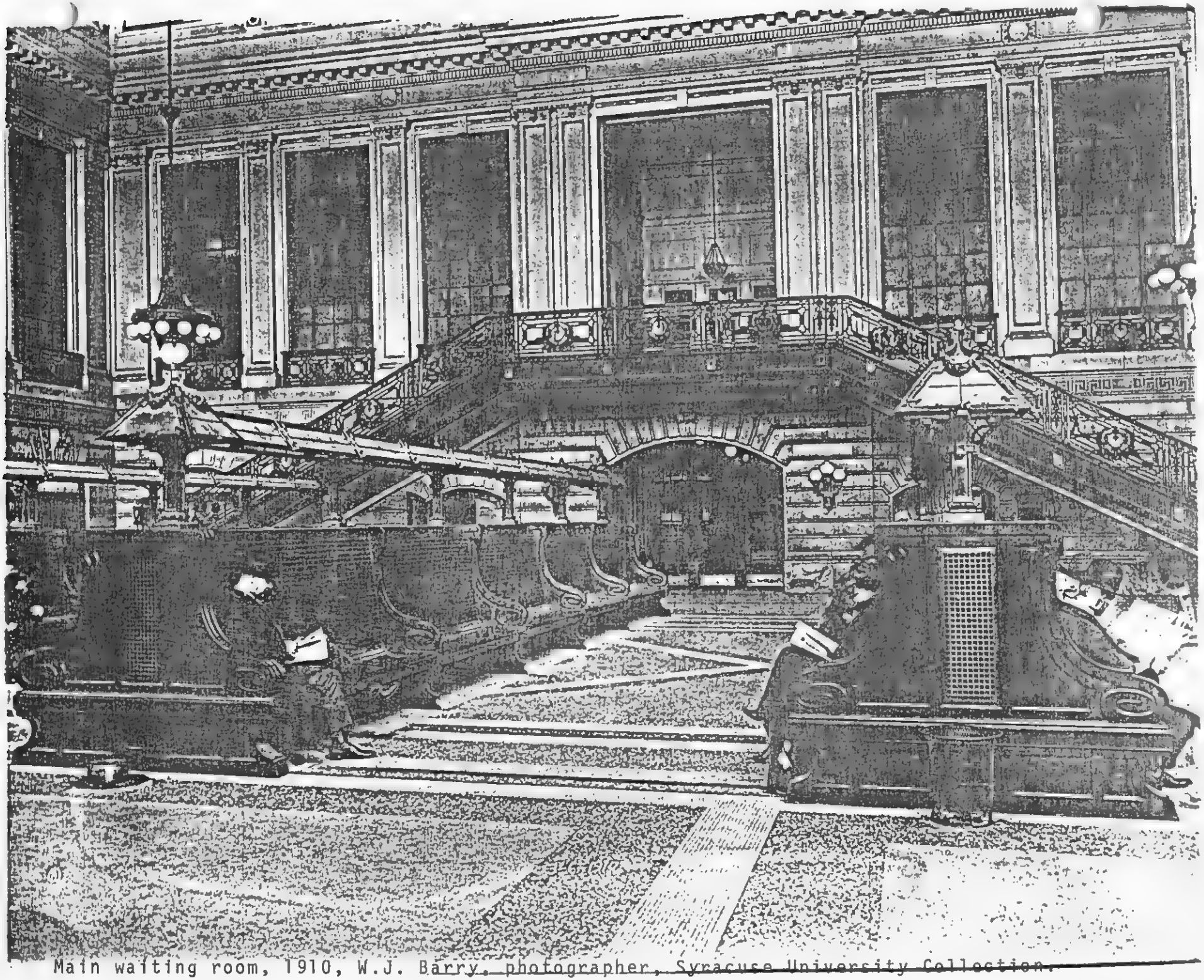
Rendering of the DL&W Railroad Terminal by architect Kenneth M. Murchison (from Romance of the Hoboken Ferry)



Steel framing for clock tower is evident in background, trolley terminal in foreground, in this poscard view. Hudson City Historical Society, Theodore Conrad Collection.



Early view of Hoboken terminal train sheds (1908), W.J. Barry photographer, collection Syracuse University, courtesy John Willever.



Main waiting room, 1910, W.J. Barry, photographer, Syracuse University Collection.

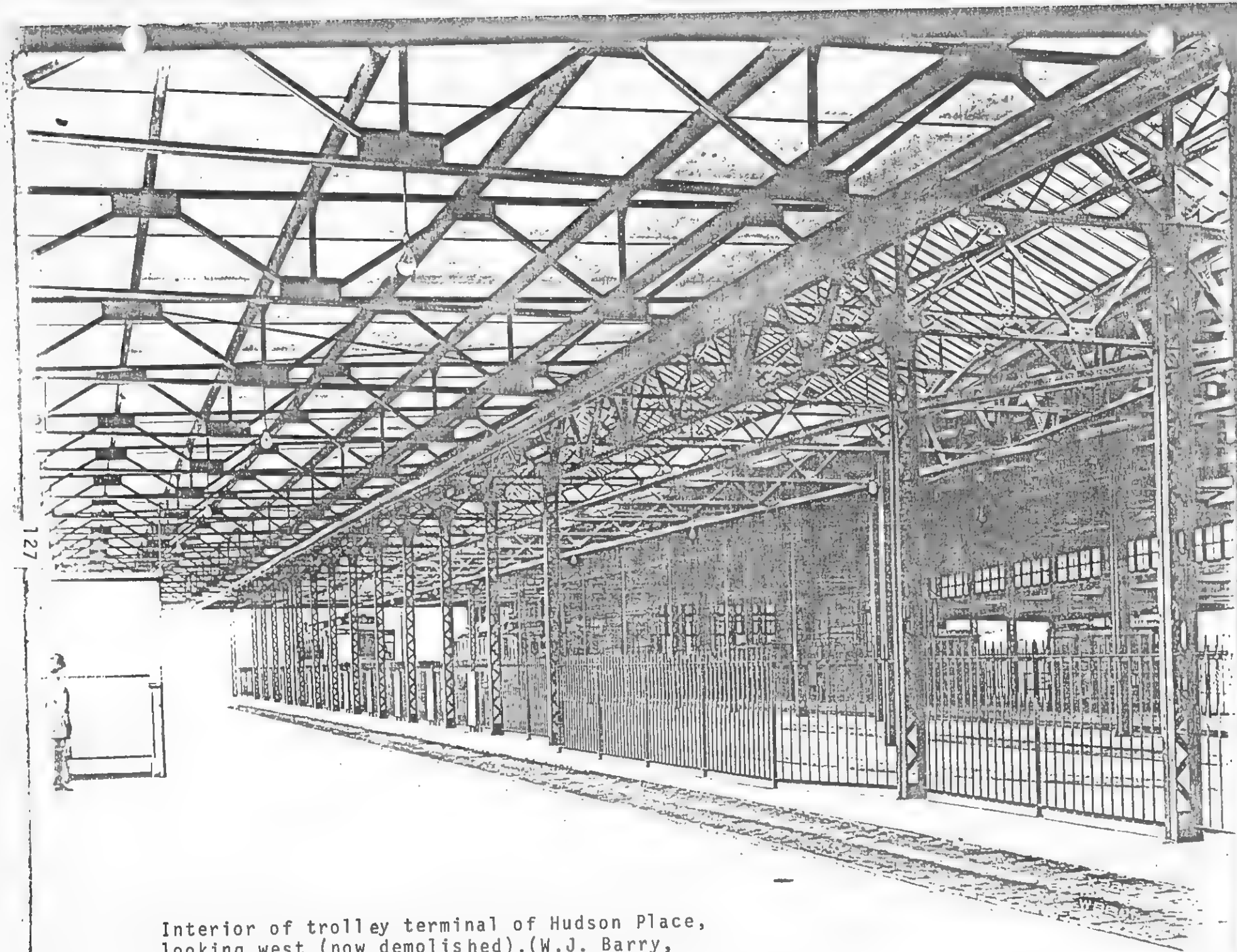
View of Ferry Plaza, with statue of Samuel Sloan in far right. Watson B. Bunell, photographer, Syracuse University Collection, courtesy of John Willever.

Early postcard view of Hoboken Terminal. Note awnings on ferry building arches. Collection Jim Hans.

View c.1910 looking northwest across train yards toward the Railway Express and Records Building (to right). Records Building now contains the vast archives of the rail engineering and law departments of the railroad, including maps from the mid-19th century. Photo by Watson B. Bunell, Jr., collection of Syracuse University, courtesy of John Willever.

This view looking northeast from the present Observer Highway, and shows the former elevated trolley lines. In the distance, to the right, the Erie-Lackawanna station was under construction in this view circa 1905. (Hoboken Free Public Library, Elysian Camera Club Collection)

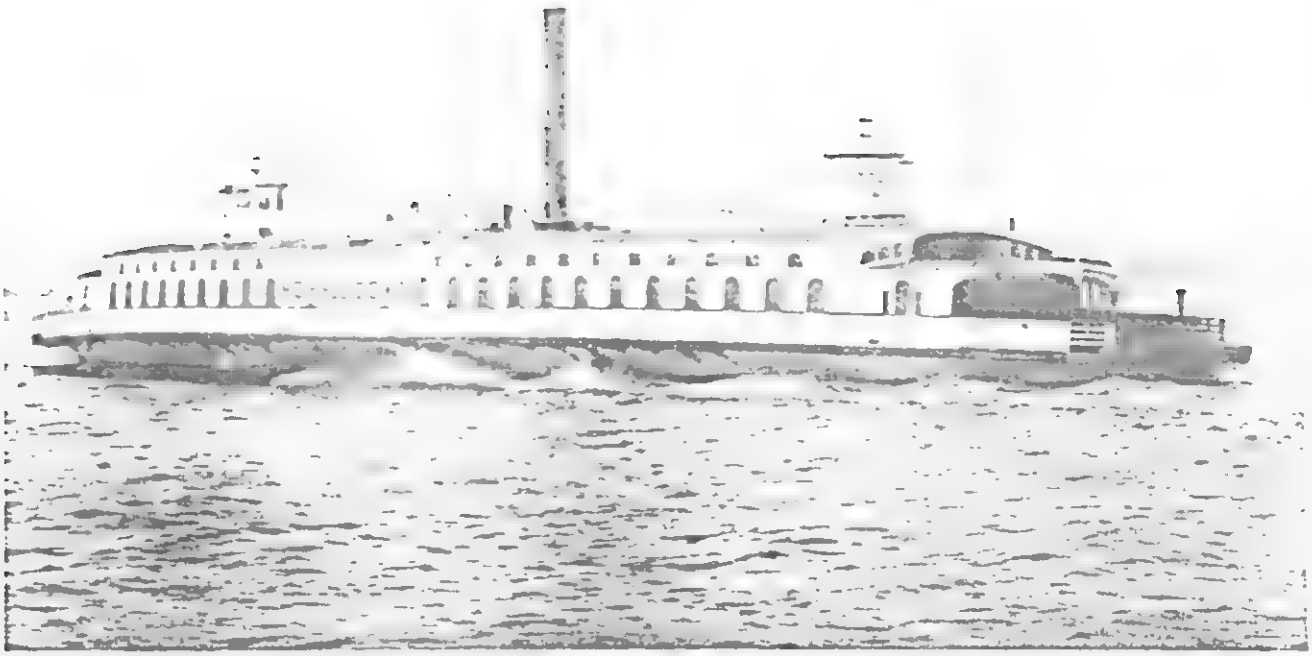
View c. 1949 of Hudson Place, looking east to ferry slips. Visible to the right is the elevated trolley terminal, which was enclosed by the copper-sheathed terminal. It accomodated bus passengers on the Hudson place side, and led to the train concourse at trade level, and to the YMCA/baggage building at its second floor. Clock-tower of terminal is visible to the right. Hudson City Historical Society, Theodore Conrad Collection.



Interior of trolley terminal of Hudson Place, looking west (now demolished).(W.J. Barry, collection Syracuse University, courtesy of John Willever)

View of west side of elevated trolley station at Hudson Place, c. 1949. Hudson City Historical Society, Theodore Conrad Collection.

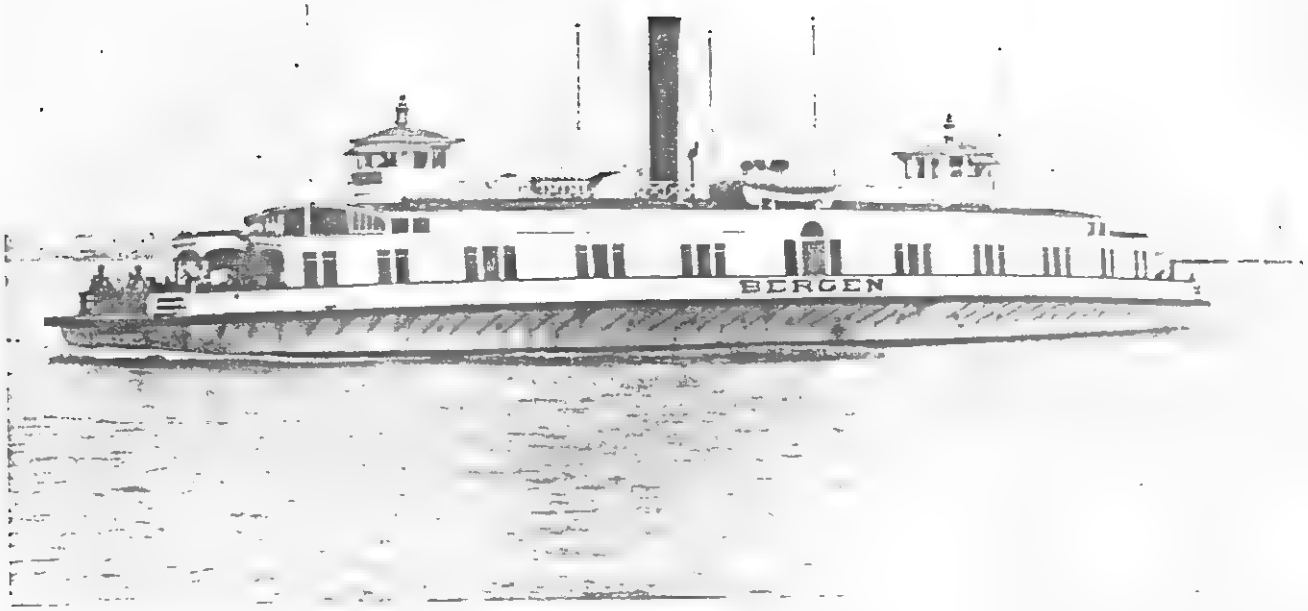
Enlargement of a postcard image of the terminal's river facade, showing Clocktower and ferries in the slips. Courtesy, Hudson City Historical Society, Theodore Conrad Collection.



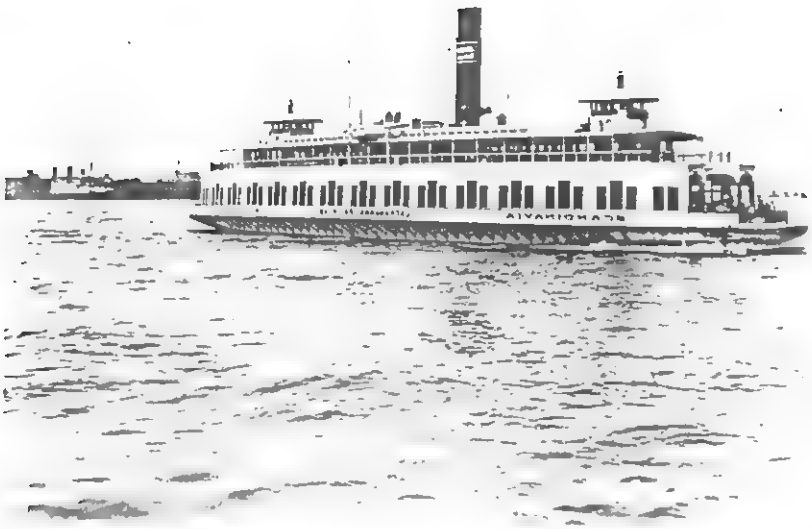
Ferryboat Morristown, built by John Stuart of Hoboken in 1864.
Photo: Romance of the Hoboken Ferry.

Ferryboat Hopatcong, was build by John Bigler & Co., of Newburgh, N.Y., in 1885. It was destroyed by the fire that destroyed the Hoboken Terminal at Hudson Place in 1905. photo: Romance of the Hoboken Ferry.

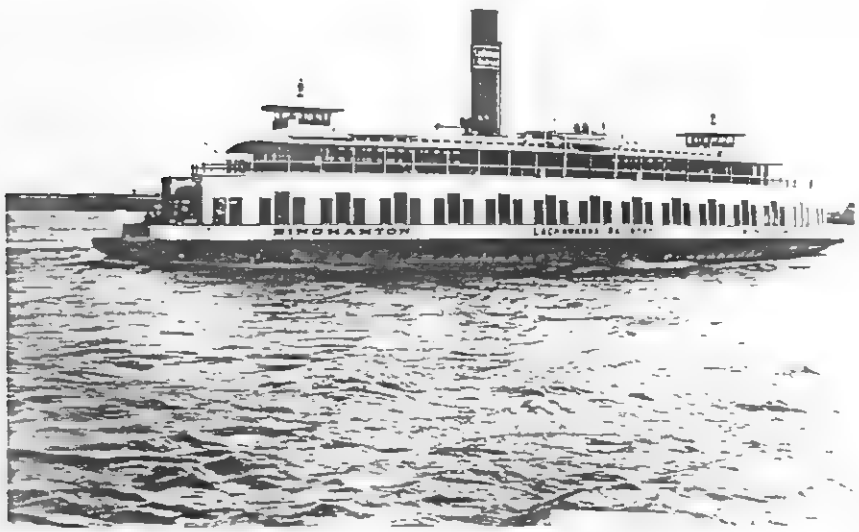
The ferryboat Montclair, built in 1886 at Newburgh, N.Y. was designed by Francis B. Stevens. Together with the Orange, it was the last of the sidewheel boats to be built for the ferries.



The Bergen, the first double-screw ferryboat, was launched in 1888. It was designed by the Hoboken Ferry Company, with the engine designed by J. Shields Wilson of Philadelphia.



Ferryboat Scandinavia, one of the three ferryboats, (Binghamton Elmira) built in 1905 by the Newport News Ship Building and Dry Dock Company of Virginia. Starting on May 15, 1918, the Hoboken ferries transported 242,330 officers for embarkation and, as of Dec. 2, of that year, an additional 127,432 officers and men. The largest number of troops transported in one day was 9,803 on Aug. 8, 1919, the day of the Victory Parade in New York.



Appendix D.

The text of a covenant entered into by N.J. Transit and the State Office of Cultural and Environmental Services as part of the conditions required for receiving a Historic Restoration Grant. The covenant which applies to all exterior work began on May 2, 1978 and runs for 40 years.

4. COVENANTS AND RESTRICTIONS:

A. RECIPIENT, its successors and assigns shall repair, maintain and administer the premises so as to preserve their historical integrity, including but not limited to their appearance, structure and design.

B. No alteration or improvement shall be undertaken which would materially affect the historical integrity of the premises without prior written approval of STATE: however, routine maintenance, repair and preservation thereof may be made without such approval. Prior written permission of STATE shall not be unreasonably withheld.

C. Upon completion of the preservation work approved by STATE, said premises shall be open to the public for visitation no less than twelve (12) days a year on an equitably spaced basis. RECIPIENT shall give notice to the public of the dates of such visitation. Where the grant monies are the subject of this Agreement are used to alter, preserve, or rehabilitate the interior features of any building on the premises, RECIPIENT shall provide the public with access to the interior spaces of such buildings. As used herein, "interior features" shall mean physical elements of the interior of a building, excluding structural or utility improvements such as electrical wiring, plumbing and structural support devices. RECIPIENT may charge reasonably non-discriminatory admission fees that will not discourage visitation and that comport with fees charged at comparable facilities in the State. Such fees shall be subject to the approval of STATE. Such fees shall be used to offset maintenance, repair and preservation costs incurred by RECIPIENT. RECIPIENT shall account to STATE annually for the amount of fees received and the amount

of maintenance costs incurred. Fees collected in excess of maintenance costs shall be submitted with such statements to STATE.

D. The foregoing covenants and restrictions shall run with the land and be binding and enforceable against RECIPIENT, its successors and assigns in any court of competent jurisdiction for a period of 40 years from the date hereof. Upon commencement of the physical preservation work for which grant monies have been disbursed pursuant to the terms of this Agreement, RECIPIENT shall submit evidence to STATE that the aforesaid restrictions have been duly recorded in the Office of County Records in the county where the property or site is located.

E. STATE shall have the first right to purchase said premises if and when RECIPIENT or its successors in interest, if any, shall offer said premises for sale. RECIPIENT agrees to notify STATE in writing, by certified mail, return receipt requested, of its intention to sell or otherwise convey subject property. STATE shall have thirty (30) days thereafter in which to negotiate and execute a contract for the purchase thereof. If no contract is executed by the parties within the thirty (30) day period, this right of refusal shall lapse.

5. THE PREMISES: Such subject property is more particularly described as follows:

Erie Lackawana R.R. Terminal
Where Observer Highway, River Street,
Newark Street, and Hudson Street
terminate and converge
Hoboken, Hudson County
Block #139, Lot #A, A1, A2

6. WARRANTIES: RECIPIENT does hereby warrant and represent that this Agreement has not been solicited or secured, directly or indirectly, in a manner contrary to the laws of the State of New Jersey and that said laws have not been violated and shall not be violated as they relate to the procurement of the performance of this Agreement by any conduct, including the paying and giving of any fee, commission, compensation gift, gratuity, or consideration of any kind, directly or indirectly, to any state employee, officer or official.

7. TERMINATION OF AGREEMENT FOR CAUSE: If, through any cause, RECIPIENT shall fail to fulfill in timely and proper manner the obligations of this Agreement, or if RECIPIENT shall violate any of the covenants, warranties or stipulations of this Agreement, STATE shall have the right to terminate this Agreement

Appendix E.

Paint analysis was performed as part of the rehabilitation of the main waiting room. Although funds did not permit a complete restoration to the colors specified in the research results, the data is presented here in order for it to be preserved for possible future use. The analysis was performed by the office of John M. Dickey, FAIA, of Media, PA.

HOBOKEN TRAIN STATION

On-site Supplementary Paint Samples

October 2, 1980

Original Treatment

1) All first floor (passenger waiting room level) woodwork:

Natural, with varnish.

2) Main double stairway to second floor:

Cast Iron: Gilt
Wood Handrail: Natural, with varnish

3) Balconettes in front of second floor windows:

Cast Iron: All Finnaren & Haley 2531W (Green Fog)
(Munsell 10Y 9/1)

4) Risers of main double stairway:

Cast Iron: All Finnaren & Haley 2531W (Green Fog)

5) Door frame to clerestory in entry at top of main stairway:

Copper Base: Painted (Finnaren & Haley 2226W)

6) Door to clerestory in entry at top of main stairway:

Wood: Natural, with varnish.

PAINT ANALYSIS SEPTEMBER 5, 1980 HOBOKEN TERMINAL

Sample Number	1	2	3	4
Feature	Windows	Wall	Handrail	Doors
Location	Above doors			
Base Material	Wood	Plaster	Metal	Wood
First Coat	N9 (primer)	-	Cannot Analyze (see letter)	N9 (primer)
Second Coat	N9 (F&H 2226W) Amaryllis	N9 (F&H 2377W) Barley Beige		N9 (F&H 2226W) Amaryllis
Third Coat	-	-		*Medium Beige
Fourth Coat	*Medium Beige	-		*Medium Beige
Fifth Coat	Medium Beige	-		*Light Beige
Sixth Coat	Medium Beige	Medium Beige		*Medium Beige
Seventh Coat	*Dark Beige	Medium Beige		Medium Beige
Eighth Coat	*Dark Beige	*Dark Beige		Light Beige
Ninth Coat	*Dark Beige	*Dark Beige		Light Beige
Tenth Coat	Light Beige	*Dark Beige		Light Beige
Eleventh Coat	-	White		-
Twelfth Coat	Light Pink Beige	Pink Beige		Dark Brown

*Soot and Dirt Surface Coating

Sample Number	5	6
Feature	Ceiling	Window Frames
Base Material	Plaster	Copper
First Coat	- -	5G 7/6 .(F&H 2632N)
Second Coat	N9 (F&H 2377W) Barley Beige	- -
Third Coat	Light Beige	- -
Fourth Coat	*Light Beige	- -
Fifth Coat	Light Beige	White
Sixth Coat	Light Beige	Dark Brown
Seventh Coat	Light Beige	White
Eighth Coat	*Medium Beige	Brown
Ninth Coat	*Dark Beige	Light Beige
Tenth Coat	*Dark Beige	Light Beige
Eleventh Coat	White	- -
Twelfth Coat	Pink Beige	Pink Beige

*Soot and Dirt Surface Coating

Appendix F Selected Bibliography

Archives and Manuscripts

Erie-Lackawanna Engineering Department Archives (vault of former Railway Express Building, Observer Highway, Hoboken), original blueprints of terminal by Kenneth M. Murchison (reproduced in Appendix B).

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James Hans (private collector), Hoboken, N.J.

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John Willever (private collector), Washington, N.J.

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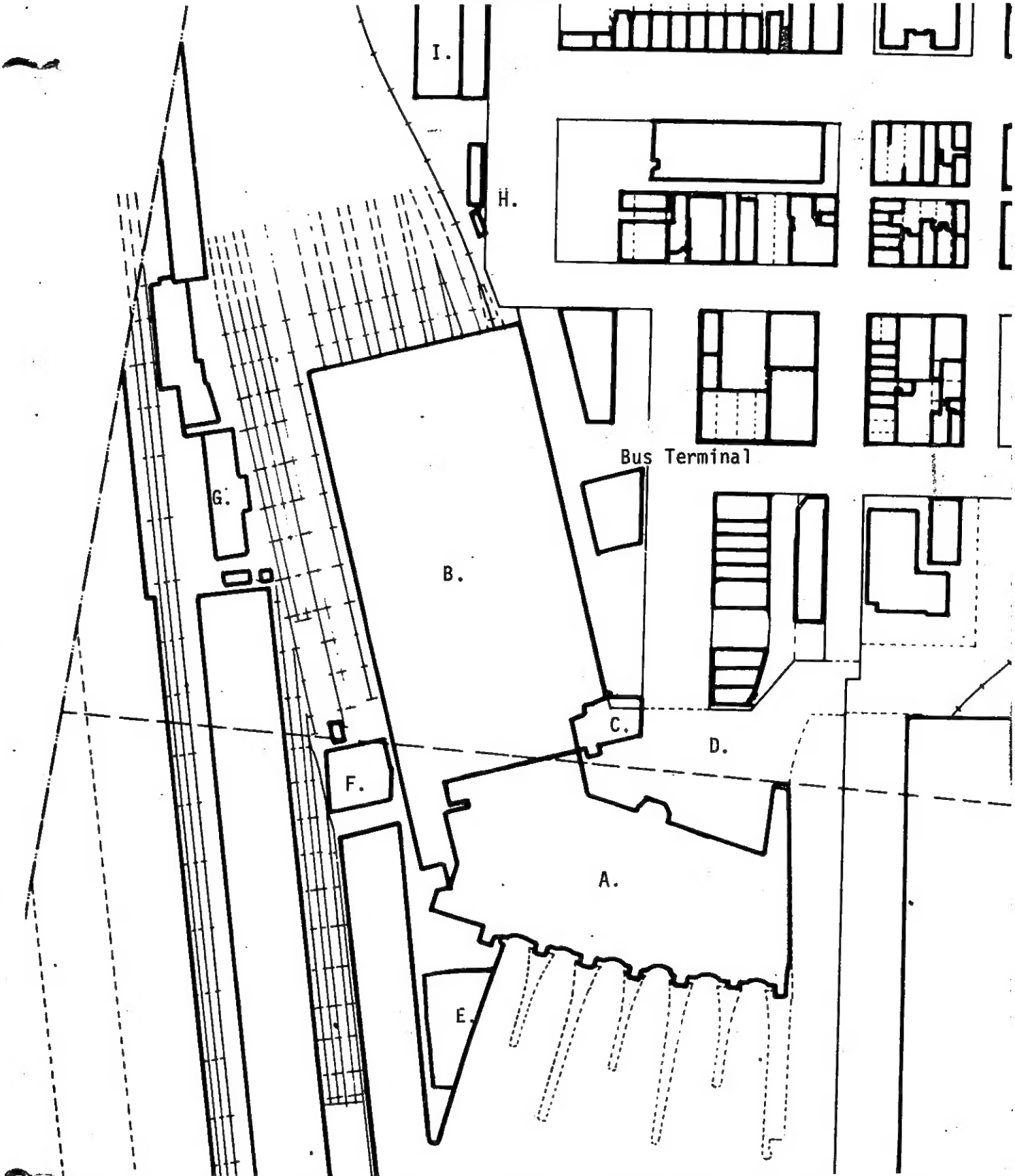
Appendix G.

ERIE-LACKAWANNA HISTORIC STRUCTURE REPORT

SITE PLAN



A. Ferry and Train Terminal; B. Bush Train Shed; C. YMCA/Baggage Building, D. Plaza; E. Pier A/Mail Sorting Room; F. Immigrant/Pullman Building; G. Substation/Pumphouse; H. Records Building; I. Railroad Express Building.